The Early

Hammarlund & National

Circuits

# A Vintage Radio MONOGRAPH

by

D. H. MOORE

The Editorial Group, Ltd...

P.O. BOX 521 • PALO ALTO, CALIFORNIA

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DEDICATION

...to a way of life -
that should not have
been forgotten.

## Autographed Edition

It is my sincerest wish that this latest contribution of my vintage radio writings may afford you as much enjoyment and usefulness as I've had in compiling it.

Over to you, and 73,

Palo Alto

# Preface

These VINTAGE RADIO IDENTIFICATION SKETCH-BOOKS have appeared in three prior editions during the last few years, and have become accepted by university libraries and historical museums, as well as serious vintage radio hobbyists as a significant contribution and ongoing reference of the rise of Radio as a distinct social phenomenon. Through all editions, the purpose of these SKETCH-BOOKS has remained the same - to return a sense of the wonder and the allure of early radio by offering identifying construction instruction of hundreds of early circuits, hardware, accessories, and personally relateable items not to be found in Riders, Sams, Beitmann, et al.

It is important that the reader recognise that these SKETCH-BOOKS and MONOGRAPHS (see back-cover) are not, and were never intended to be, a comprehensive treatise embracing the entire field of early wireless communication, or a course in radio and electrical theory. They have been designed to be utilised by serious hobbyists.

A general knowledge of the vocabulary and the jargon of Radio has been assumed. The use of definitions and mathematical formulae has been deliberately avoided, as such information is readily available from other sources. However, if questions arise from any part of these SKETCH-BOOKS and MONOGRAPHS, the author will be pleased to have a go at answering such questions.

As the "bug" below states, the real fun of Radio has always been in doing it yourself, and not in merely collecting this or that marque and placing it on a shelf to gather dust, mute and motionless, and ambiguous to the non-hobbyist.

D.H.MOORE, A.D.I.

# HAMMARLUND & NATIONAL

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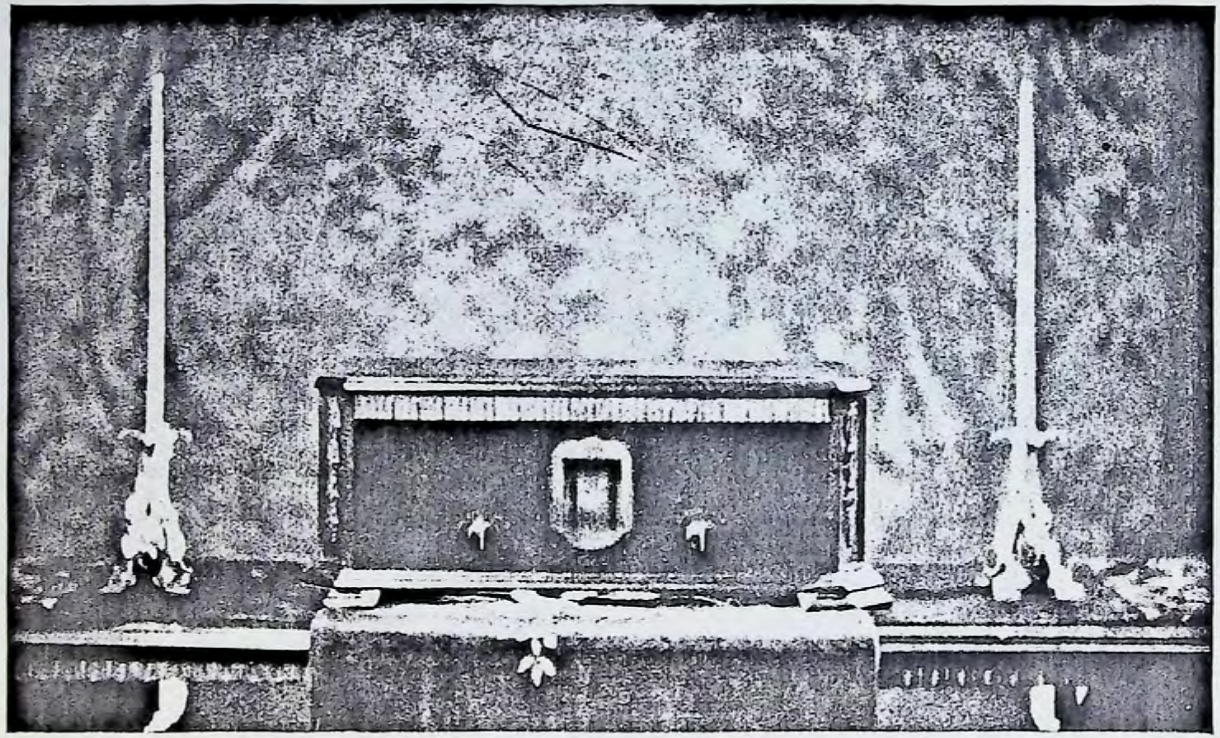

*The New Improved Hi-Q Six—the creation of ten foremost American Radio Engineers — a receiving instrument that is far in advance of its time.*

Hammarlund
ROBERTS
Hi-Q SIX

The most popular of all the Hammarlund-Roberts "Hi-Q" receivers.

(Frontispiece)

"VINTAGE RADIO IDENTIFICATION SKETCH-BOOKS of D.H.MOORE"

Hammarlund
ROBERTS
Hi-Q

While the marques of HAMMARLUND and NATIONAL are remembered with affection by ham-radio buffs of the Thirties and Forties, few are aware of their earlier efforts in the marketplace.

Yet of all early radio manufacturers, these two firms were the most aggressive and progressive in promoting short-wave reception, although neither were too deeply involved with transmission gear. They were the first to utilise R&D data developed by M.I.T. and G.E. and to employ the skills and knowledge of such men as Biles, Millen, Schnell, Hatry, which obviously contributed to their rapid advancement.

The HAMMARLUND Manufacturing Company began operations in N. Y.C. in 1911, and like most early radio pioneering firms began by producing precision instruments and components for telephone, telegraph, and spark-gap radio. Their main line seems to have been variable condensers and coils. Their attention was turned to the growing number of home-constructors in radio after Wilhelm's War, when it became obvious that RCA's attempts to dominate and monopolise commercial and marine wireless communication was meeting with oposition.

Their first offering was their Model C variable condensers, first released in 1924. Its chief feature was that instead of the conventional round tuning dial attached to the rotor shaft, the Model C had an "L"-shaped handle about four inches long, the end of the handle encased in rubber. It might be worth mentioning that NATIONAL also had a similar offering a couple of years later, but both were short-lived. The first HAMMARLUND dual variable without the "L"-shaped handle came out in August of 1925.

The HAMMARLUND-ROBERTS reflex and non-reflex sets were the first complete receiver offerings, 1925, and were of immediate and indefinite popularity, which lasted until the HAMMARLUND "Hi-Q" series.

In the interim HAMMARLUND began manufacturing a variety of components and accessories, such as chokes, coils, coil forms, trimmer or "equalizer" pads, specialty variables, midget condensers, etc., as did NATIONAL a few years later. Both firms continued well into the 50s with such lines, and you will find several depicted in the back pages. With HAMMARLUND this could have simply been a logical extension of the work they were doing before Wilhelm's War, but with NATIONAL it seems to have been their primary objective from the first.

It was the fashion, there in the Twenties, for sets primarily designed by a well-known individual or company to offer the basic circuit to the fraternity, usually through radio media, and while insisting upon the use of their own components such as variables, coils and the like, they made much of also advertising the name of others, who manufactured components or hardware they felt was worthy of their circuitry. In a sense, it was a kind of mutual support and individual advancement, not to mention a savings in the cost of advertising.

The original HAMMARLUND-ROBERTS, for example, was actually a kit offering, but accompanying the advert was a listing of manufacturers whose products were used in the HAMMARLUND-ROBERTS:

| | |
|---|---|
| All-American (Rauland) | Na-Ald (Alden) |
| Westinghouse | Radiall |
| Carter | I.R.C. |
| Union | Micarta |
| Benjamin | Belden |

Needless to say, comparable products by other manufacturers could be used with equally satisfactory results, but most of the companies included in the above list were, at that time, still trying to fight or at least slow down the octupus we know as RCA. That most subsequently bent the knee and accepted RCA licenses is beside the point here. For details of such machinations, refer to Vol. I of the "VINTAGE RADIO IDENTIFICATION SKETCH-BOOKS of D.H.MOORE".

Stated another way, until the Thirties, there was actually no such thing as a completely HAMMARLUND or completely NATIONAL short wave receiver; and it is their pioneering efforts in the field of SW that they owe their long-standing reputation.

The late Twenties saw a violent explosion of interest in a means of picking-up the foreign broadcasts of news and music that the foreign governments were beginning to underwrite. Such broadcasts included England, Holland, Germany, Greece, France, Italy, Japan, Indo-China, on the one hand, and such odd places as Latvia, Albania, Lapland, Montinegro, Irish Free State, Union of South Africa. Prior to Wilhelm's War, SW broadcasts were essentiall CW traffic between some ham-operators, ship-to-shore telegraphy, and marine weather codes, so

when foreign countries began broadcasting news and music, it naturally created a further interest in wireless reception.

It was also a fact that few commercially available receivers or circuitry available to the avid home-constructor were capable of operating at the new high frequencies, so the craze for SW reception was on. SW adapters and converters became in vogue, and very few were really useful or efficient. The mysteries of band-spread, single side-band, the pentode tube, sectional shielding, chassis grounds, an awesome plethora of gadgets, gimmicks, and worthless accessories claiming to assure SW reception "with absolute realism", flooded radio magazines well into the Forties.

All of which tends to emphasize the genuine contributions of HAMMARLUND and NATIONAL. In the Twenties the Artic and Anartic became a focus of popular attention in news-media, and our radio media were not far behind. The McMillan, Byrd, Morrisey expeditions were heavily touted, not in terms of the adventure, but in terms of whose SW communication gear was used. Firms such as ZENITH, PILOT, HAMMARLUND,NATIONAL or MARCONI were all in the act, one way or another. PILOT even sponsored a South America Good-Will Flight, much publicised, in which PILOT equipment was obviously bally-hooed.

The expression "Short-Wave" is a relative term. In 1925, for instance, 600 meters was considered a short-wave frequency. The expression, even as "wavelength", was and is merely a convenience of definition, by means of which we reference how a radio signal travels from an operating broadcasting station's transmitter to a receiver. It is also of equal convenience to represent both expressions graphically as sine-waves rising and falling along a datum line. Only that and nothing more. It was the deficient state-of-the-art, not a lack of knowledge, theory, or design capability. The materials available simply could not be made to produce the results desired. Today, when we take for granted so many authentic technical marvels, it is difficult to appreciate the frustrations and moments of triumphs of our early pioneers in radio; yet it is to just such men that we owe many of our modern marvels.

The following pages offer a compendium of most of that early circuitry of both HAMMARLUND and NATIONAL, prior to 1931. Because extensive literature still exists on both companies' products from before and after Hitler's War, no reference is made to it here. The romance of pioneering SW reception occurred prior to 1931, and as a latter-day adjunct to Radio as a sociological phenomenon deserves to be remembered.

* * *
* *
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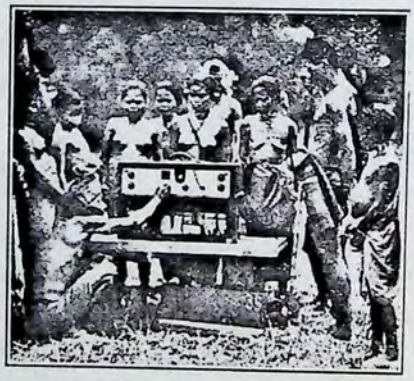
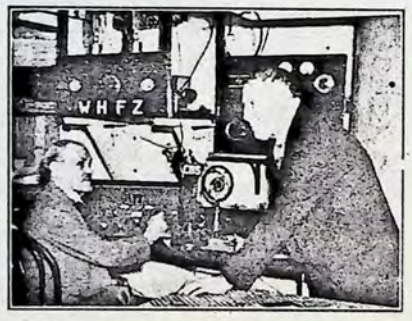
Leslie G. Biles.

SECRETARY,
HAMMARLUND-ROBERTS, INC.



**SHORT WAVE FANS IN JUNGLES OF MALACCA**

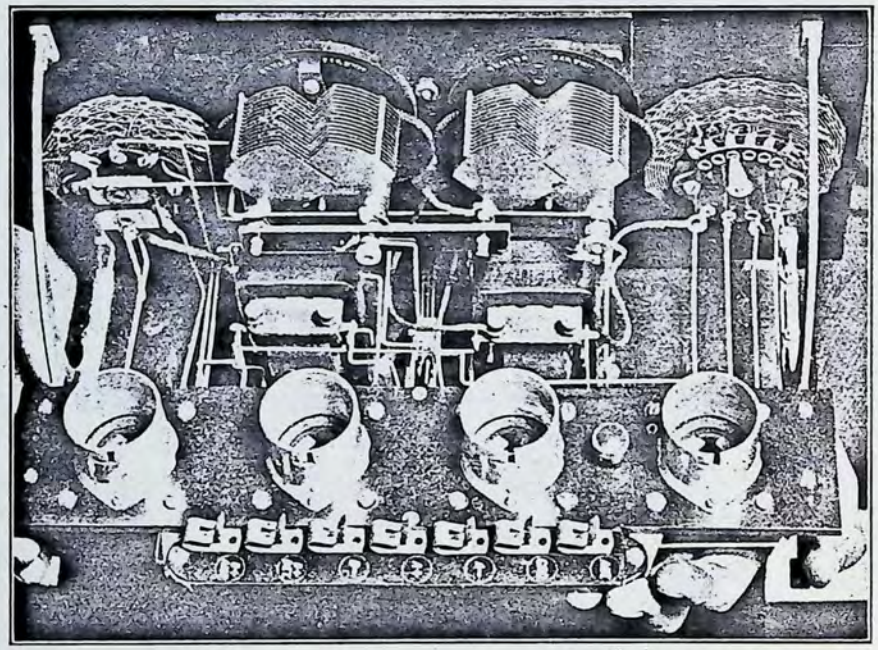
*A group of Jungle Dwarfs (the Sakai) tuning in on a short wave regenerative receiver brought to them by Frank Buck. The variable condensers, sockets, coils, etc. are all HAMMARLUND.*




**HAMMARLUND SHORT WAVE RADIO ON THE MORRISSEY**

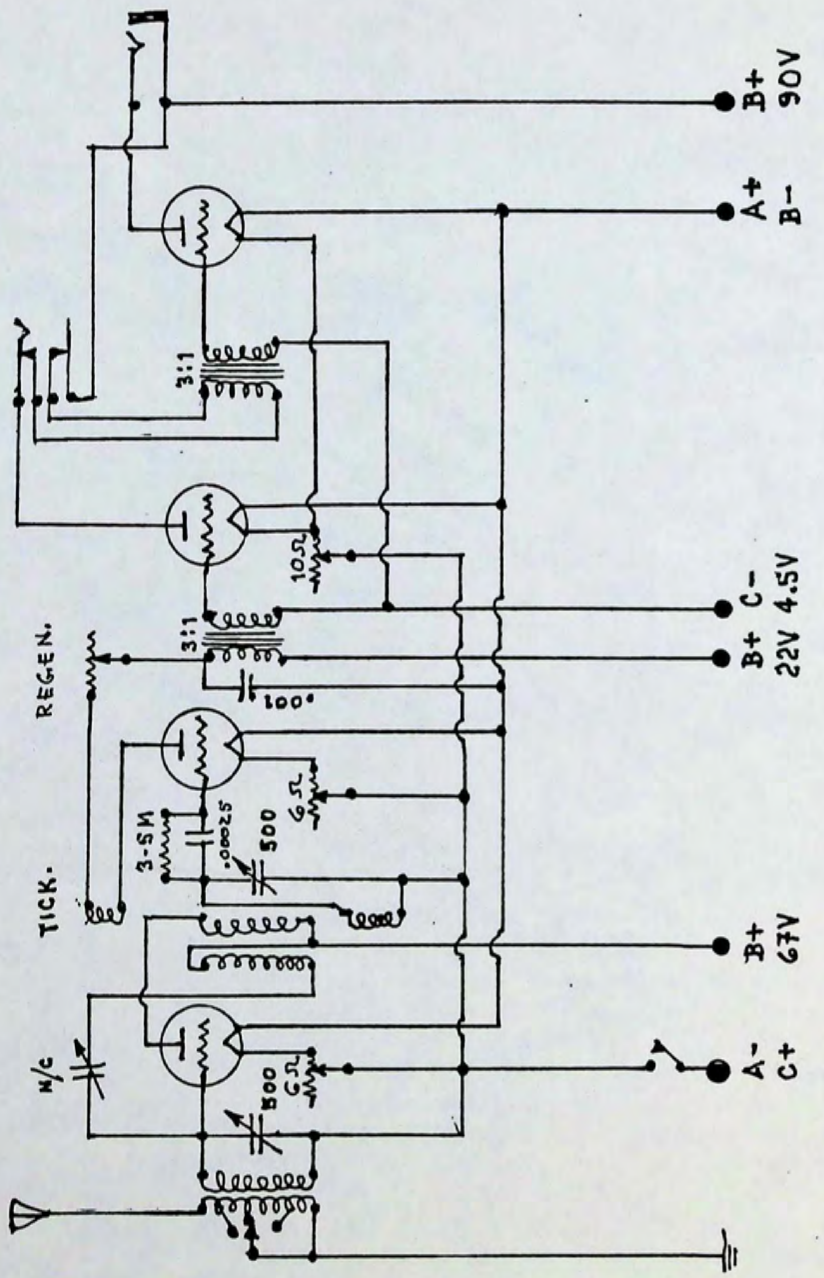
*Oscar Hammarlund (left) at the controls of a Hammarlund "Pro" with Capt. Bob Bartlett looking on, on board the Morrissey, the North Pole schooner.*

# 4-Tube Roberts



This set differed from earlier ROBERTS in that it was not a reflex, was physically smaller, and employed a couple of unique components then available for a brief period - the HANSCOM S-C unit with its twin REMLER variables, and the CLAROSTAT tuning inductances. Both enjoyed a brief if selective popularity during 1926.The audio transformers were by PIONEER (short-lived):the ganged tube-socket platform was home-made. The diagram over-leaf is conventional, the rheostats shown in the filament string should be of the proper value for the tubes used: the set will work with 99s, 01As, etc. The chief appeal of this ROBERTS seems to have been its diminutive size, the panel being only 10" wide.

4-TUBE ROBERTS, 1926 - Sht. 2

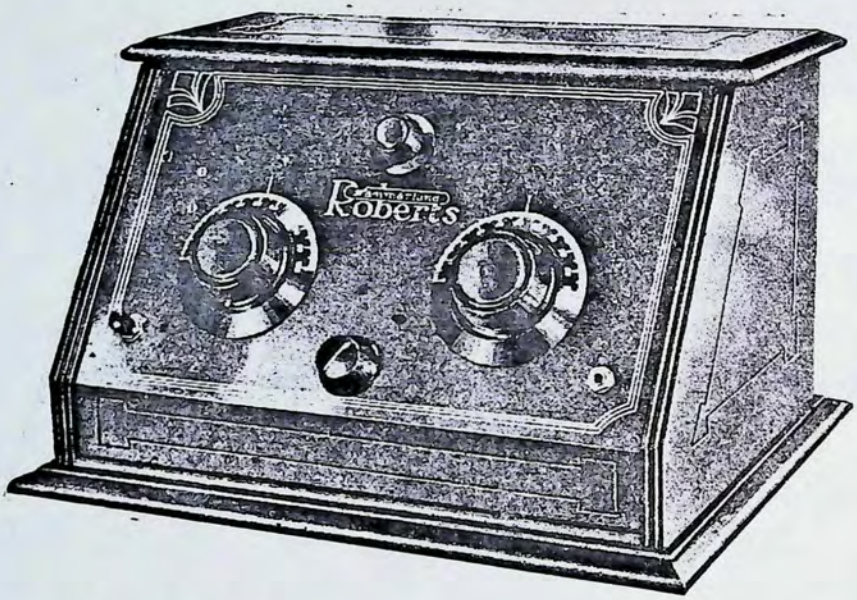



CIRCUIT DIAGRAM OF THE ROBERTS SET, unreflexed and using two audio transformers. Regeneration is controlled by a variable resistor connected across the fixed tickler.

The "Clarotuner" was Model 2RK, by CLAROSTAT. ($7.50)

(RW 11-7-29)

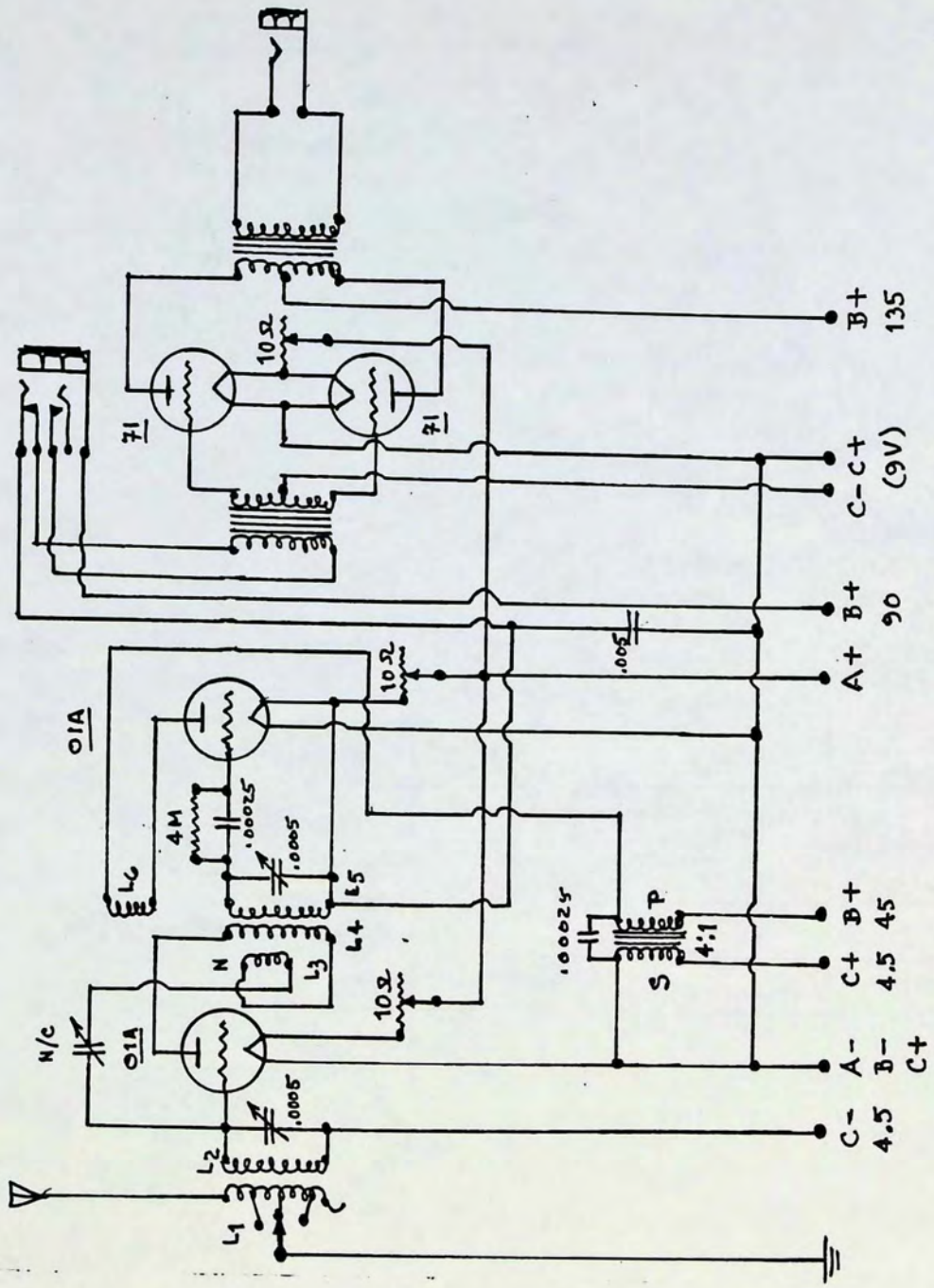
ROBERTS 4-TUBE REFLEX RECEIVER, 1926; Sht. 1



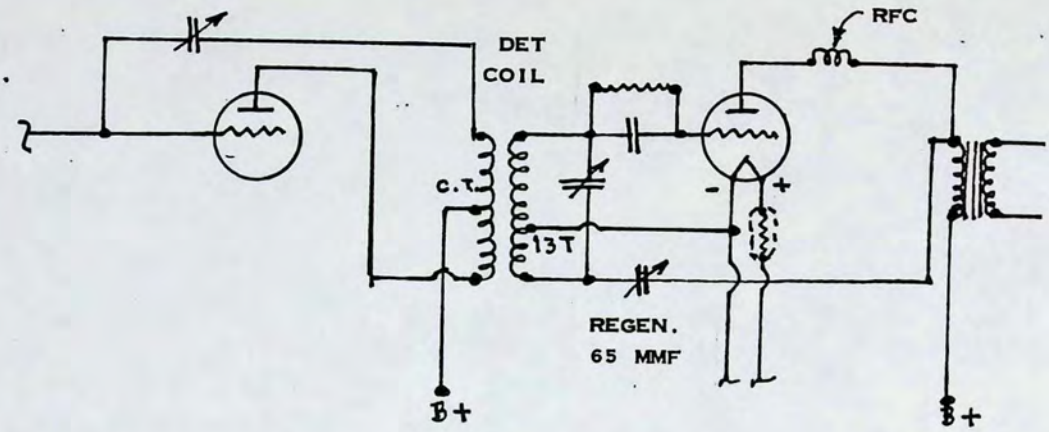

COIL DATA

| Coil | Turns | Tapt | Form | Gauge | Notes |
|---|---|---|---|---|---|
| L1 | 40 | Every 10T | 3"Ø | 22 DCC | L1 & L2 wound in same direction; ¼" spacing. |
| L2 | 45 | ~ | 3"Ø | 22 DCC | |
| L3 | 40 | C.T. | 3"Ø | 26 DCC | Wound over FIL end of L5 SEC. |
| L4 | Bunch-wound | ~ | ~ | ~ | |
| L5 | 45 | ~ | 3"Ø | 22 DCC | ~ |
| L6 | 20 | ~ | 1½"Ø | 26 DCC | Mounted at GRID end of L5 SEC. |
| | | | | | |

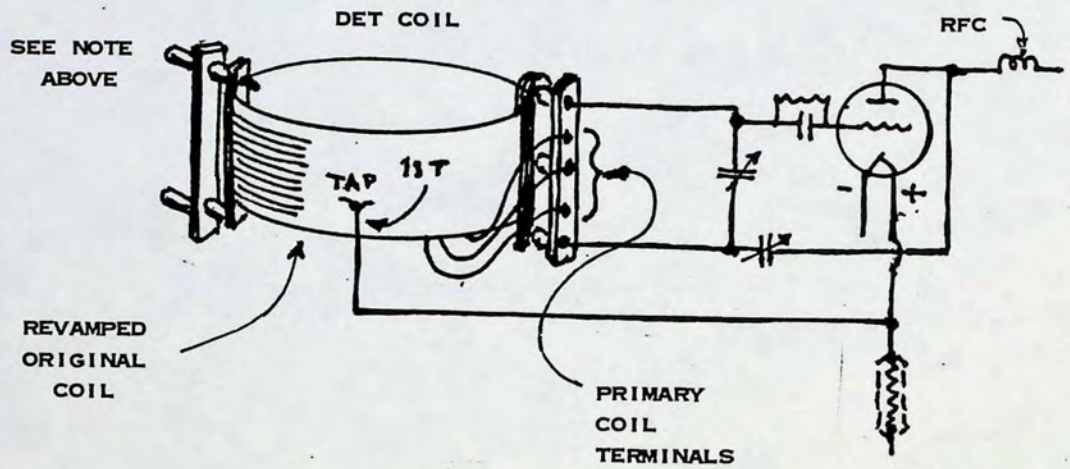
ROBERTS 4-TUBE REFLEX RECEIVER, 1926; Sht. 2



ROBERTS 4-TUBE REFLEX RECEIVER MODIFICATIONS, 1926; Sht.3




Circuitry not shown remained unchanged. Coil changes are sketched below, and coils were mounted on the back of of the upper front panel, requiring two new holes.

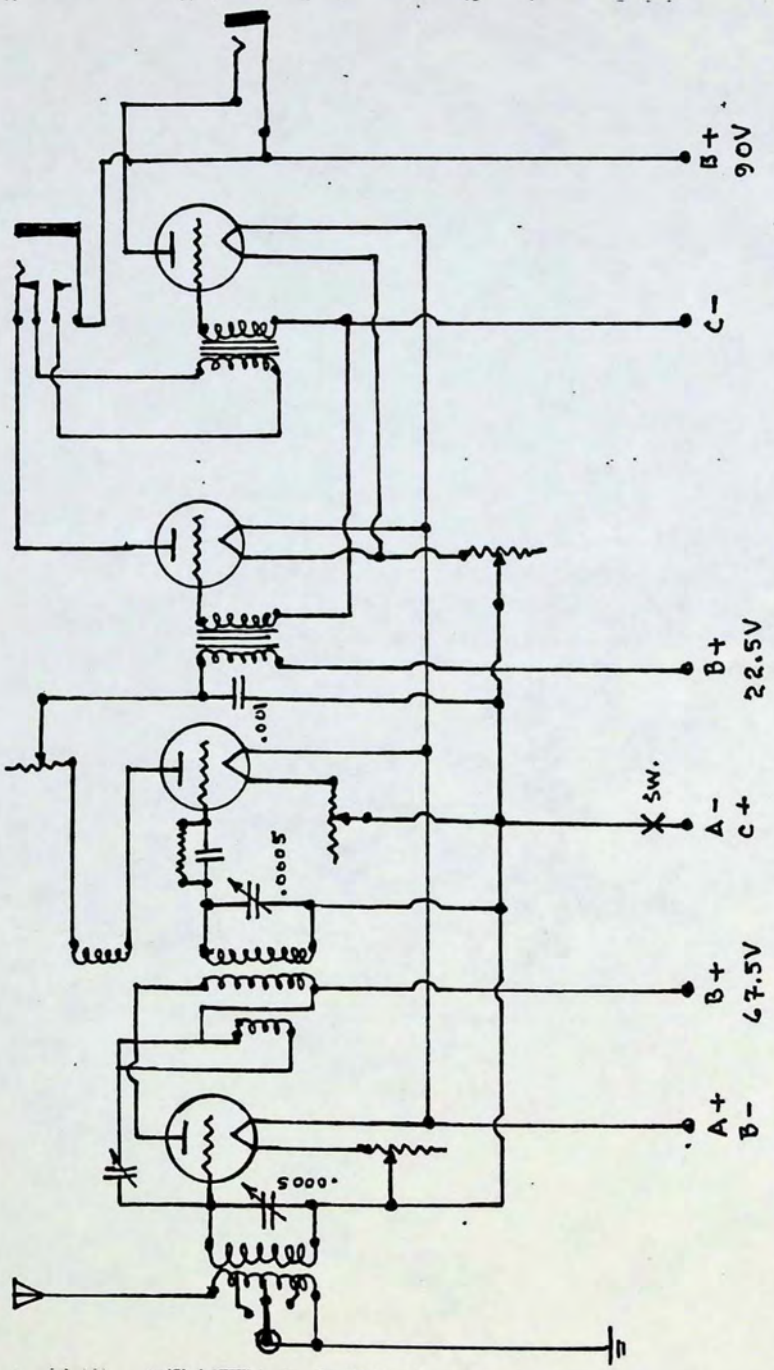



PARTS DISCARDED FROM ORIGINAL CIRCUIT

FIL Switch  Socket  Tickler Coil  4-ohm Resistor  By-Pass  Normally Open Jack

(RB 7-26)

ROBERTS NON-REFLEX RECEIVER OF 1926



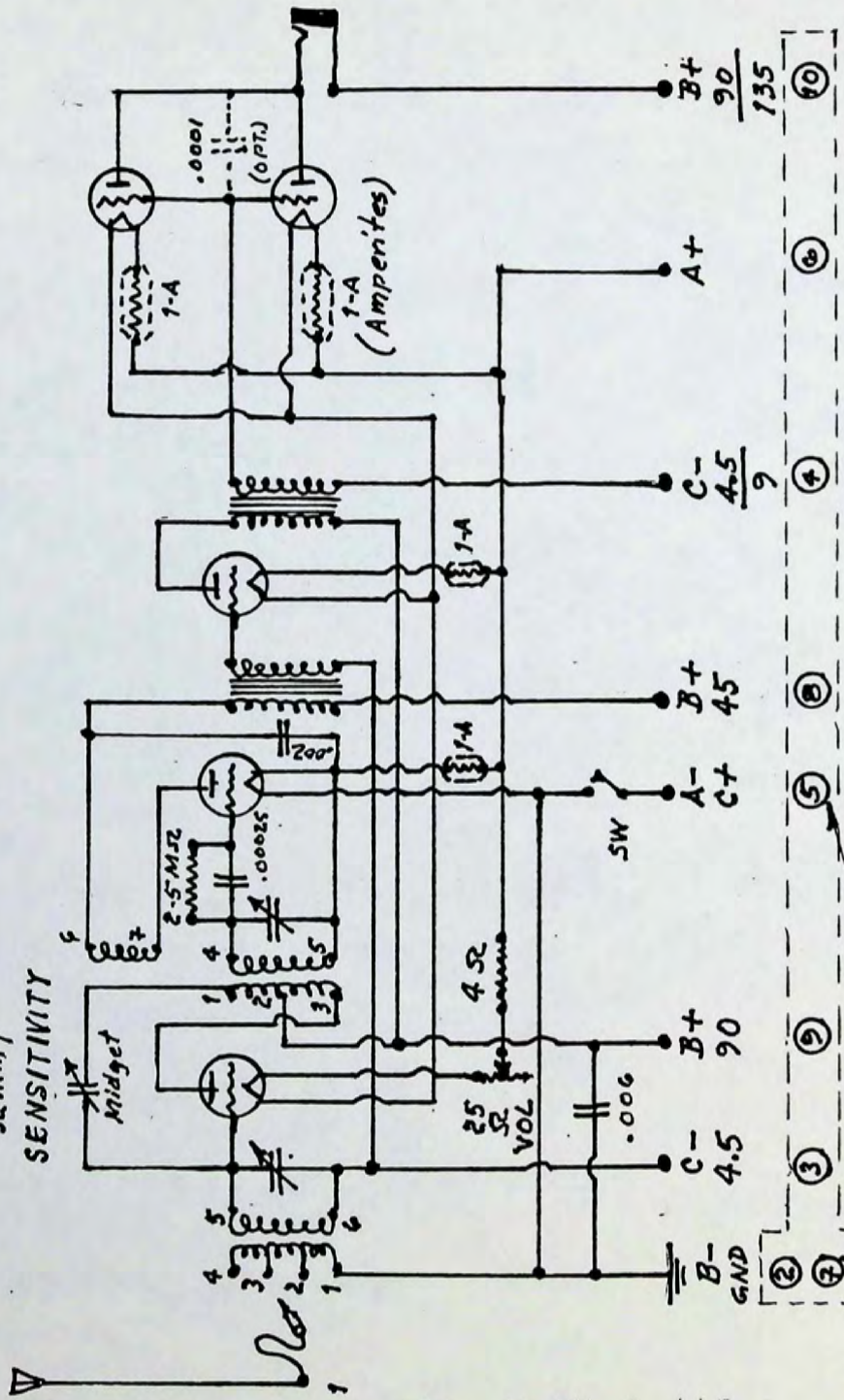

REMLER "Twin-Rotor" Variable Condensers.

Refer to prior sheets for values not shown.

## NOTES

(Sht. 1)

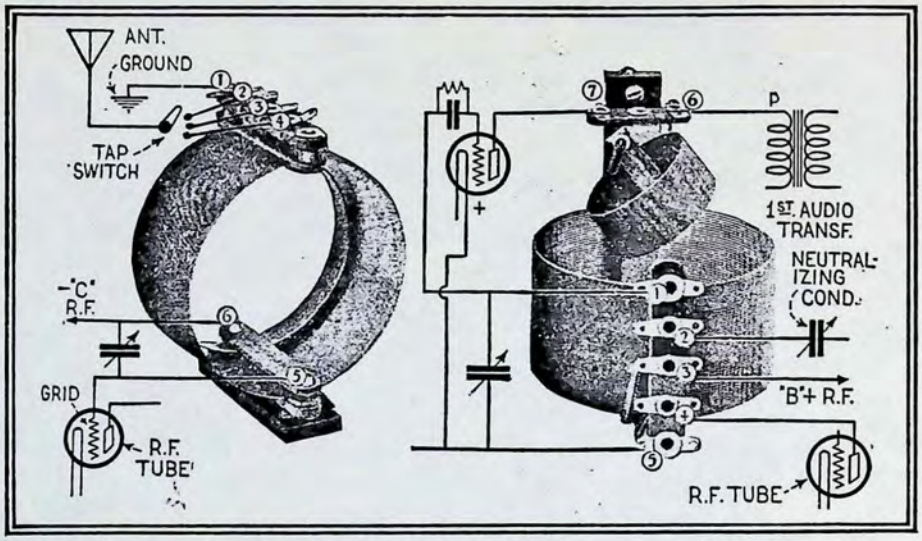
## HAMMARLUND-ROBERTS 5-TUBE REGENERATIVE:'26




.0005MFD Variables, Model "C"(2).
Na-Ald "Super De-Luxe" 4" ø Dials.
Na-Ald K3844 1.75" ø Dial.
1 Set H-R Coils.

Rauland "Lyric" AF Xfrmrs. (2)
Carter "Imp" Switch
#101 Jack
25-ohm Rheostat.

(Sht.2) HAMMARLOUND-ROBERTS 5-TUBE REGENERATIVE; '26




COIL CONNEXIONS

INITIAL PROCEDURES:

1. Connect ANT to middle tap of ANT coil.
2. Turn both dials to "0".
3. Rotate SENSITIVITY control completely CW.
4. Rotate both dials simultaneously until a squeal is heard.
5. Tune in squeal for maximum strength.
6. Rotate SENSITIVITY control until signal is clear.
7. Retune variables for best sound.
8. Turn out RF tube with rheostat; signal should weaken.
9. Adjust SENSITIVITY control until signal disappears.
10. Turn up RF tube and retune variable for best signal.
11. Turn down RF tube and re-adjust SENSITIVITY for max. signal.
12. Set is now neutralised, or balanced.

TROUBLE-SHOOTING:

(a) If a mild but persistent singing noise occurs, try reversing the PRI ends of the xfrmr.
(b) If regeneration does not occur, try reversing connexions to terminals 6 and 7 (tickler coil).
(c) Poor signals may indicate:
ANT or GND defective.
RF stage not amplifying signal.
Tube(s) defective.
Speaker or phones defective.

(d) Place a pair of phones in the B- lead. If a signal is heard in the DET circuit but not in the speaker, trouble is in the AF amplifier.
(e) If no signal is heard in the DET circuit, and if a click in the phones is heard when the tube is turned on and off, or when the "G" post of the DET socket is touched or B- lead disconnected, the tube does not oscillate.
(f) To test the DET, remove the RF tube and advance the SENSITIVITY control to ascertain that the DET does oscillate. If it does, that is all that is needed to get the amplifier working. If DET does not oscillate, reverse tickler connexions, or increase B+ to DET.
(g) Connect ANT to "P" post on the second socket. The receiver is then working as a 3-circuit tuner and signals should be heard. If the tube does not oscillate, loosen the coupling of the ANT by placing a small condenser in series with the ANT and the "P" post of the second socket.
(h) If a signal is heard, remove ANT wire and place on "G" post. Signal should now be louder.
(i) Place ANT wire in its normal position and re-tune both RF and DET circuits.

NOTE:

One dial division equals 10 KC.

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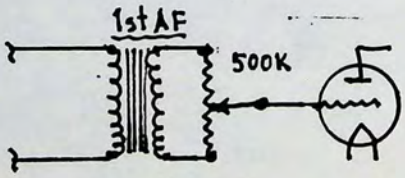
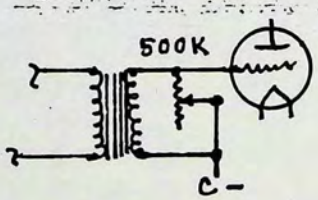



ALTERNATIVE VOLUME CONTROL METHODS



Sht. 1

The first "Hi-Q" receiver designed by Hammarlund-Roberts was presented to the home-constructor in the winter of 1926. It was offered as a kit, and sold for $85. With the dollar on the gold standard and the average weekly wage being $12 per week, the H-R kit could be considered dear. A factory-wired version sans cabinet was later offered for $95. The "Hi-Q" was quickly followed by the "Hi-Q-6", which proved to be extremely popular, and held a dominant position in the marketplace for several years. The later "Hi-Q-29" showed several minor improvements in the circuitry, but it never really caught-on like the "Hi-Q-6". The Wall Street Crash may have had something to do with it. Other "Hi-Q" circuits will be found in the following pages.

* * *
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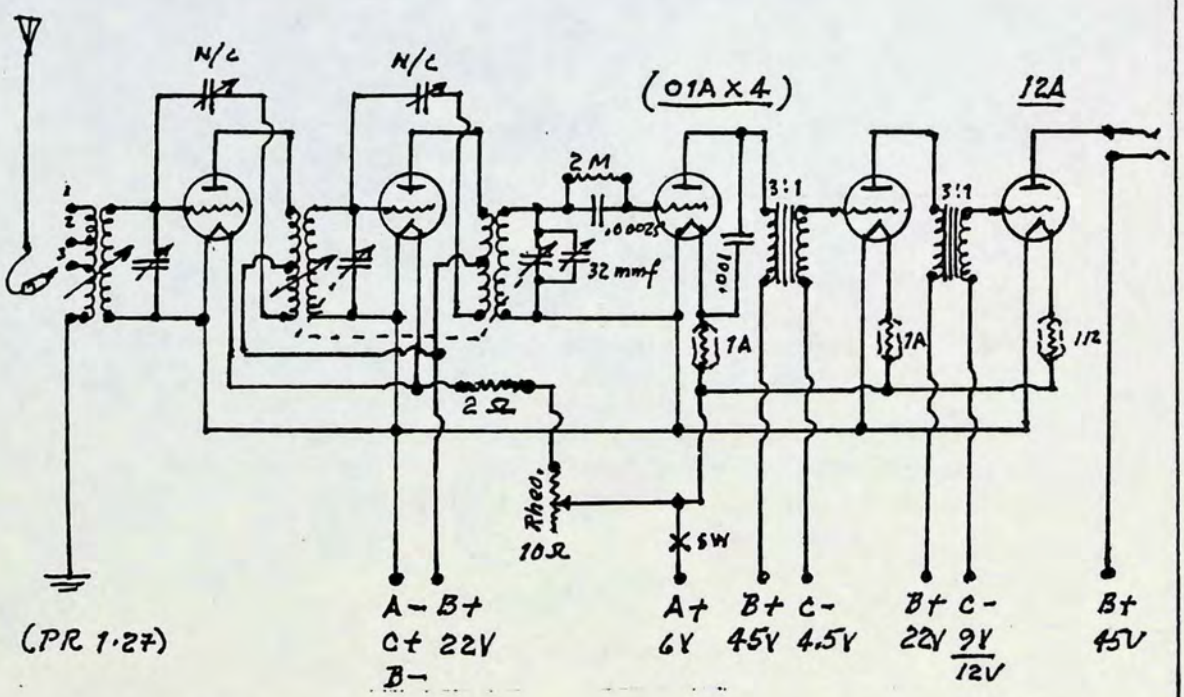
(Sht. 2) THE FIRST HAMMARLUND "Hi-Q", 1926

## MAJOR PARTS LIST

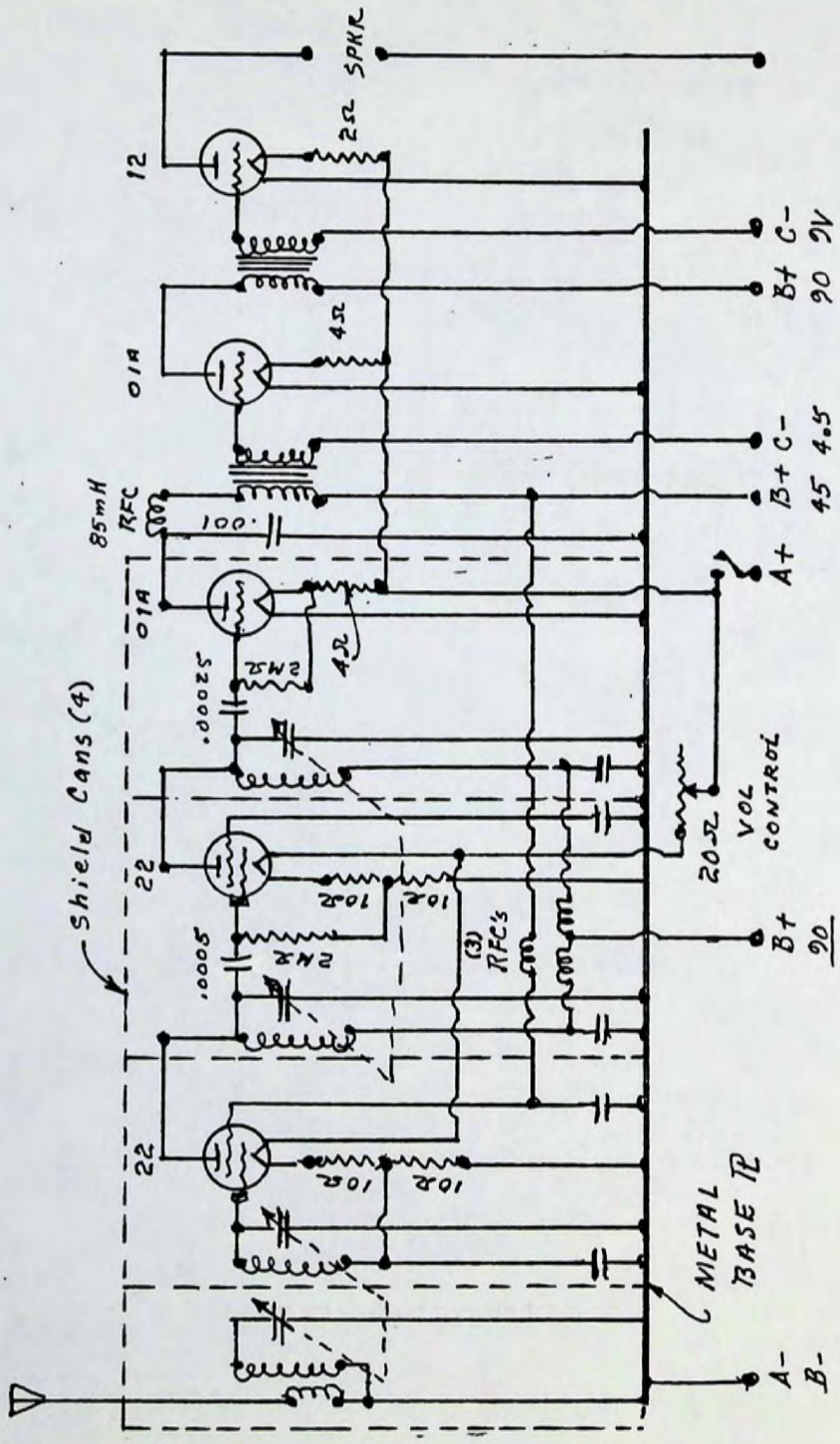
(3) HAMMARLUND RFT auto-couple coils.
(3) " 350mmf Variables.
(1) " 35mmf Midget Variable.
(2) " Shield Boxes.
(2) SAMSON HWA-3 AF Xfrmrs.
(1) CARTER combined rheostat & switch.
(1) " ANT switch No.12.
(1) " Short Jack No. 1
(2) X-L "N" Neutralizing Condensers.

## NOTES

1. Panel and baseboard were composition material.
2. Original cost of parts = $63.05.
3. MAR-CO vernier dials used in original set.
4. The tuning variable has an integral cam which operates the PRI coil of the RF couplers.



HAMMARLUND "Hi-Q" w/ SCREEN-GRID TUBES;'28




NOTES:

1. All Variables = 500 mmf.
2. All By-Pass Cond. = .5mfd.
3. The Hi-Q-6 Foundation Unit Was Used for this Version.

# Electrifying the "Hi-Q"

One of the longest running, and probably the most banal of all spurious controversies which has arisen since "vintage radio" became a nationally-oriented hobby, has been the one that turns on whether or not to "electrify" an old battery set.

While every hobby has its "purists", who shudder when they see a small scratch on a cabinet that is 50 years old, or a slightly deteriorated decalcomania on a chassis, puritism doesn't seem to be the basis of this controversy. The chief argument for electrifying a former battery set seems to be that the manufacturers of a given set themselves offered details of how to use AC for their sets. This is a specious argument, of course, in as much as the appeal and fascination of the early sets lies totally in their pristine conception or execution, considering the then-state-of-the-art and our present-day knowledge...about which we needn't feel smug.

However, as it takes all kinds of men to make a democracy

ELECTRIFYING THE FIRST "Hi-Q"; 1927 (Sht. 2)

work, you will find in the next five pages details for electrifying the first "Hi-Q". In other volumes of this work you will find other pieces treating of electrification of early battery marques, assuming such labours fascinate you.

The following data have been epitomised from the prolific media writings of Leslie G. Biles. Nominatively, he was the treasurer of HAMMARLUND, but he seems to have been a most adroit publicist. His writings, always about HAMMARLUND sets or components, appeared for several years, almost monthly, in such early radio media as Popular Radio, Radio, Radio Broadcast, Radio Journal, Radio Engineering, Radio Craft, etc. His articles were well-written and with the unskilled or non-technical reader always in mind, without being sophomoric, as some of our earlier media writers were prone to be.

While what follows is straight-forward enough, there may be a question or two not anticipated. If so, you should feel quite free to contact the author - about this Monograph, or any of the 10 volumes comprising THE VINTAGE RADIO IDENTIFICATION Sketch-Books of D.H.MOORE. Your questions and comments will be promptly answered.

* * *
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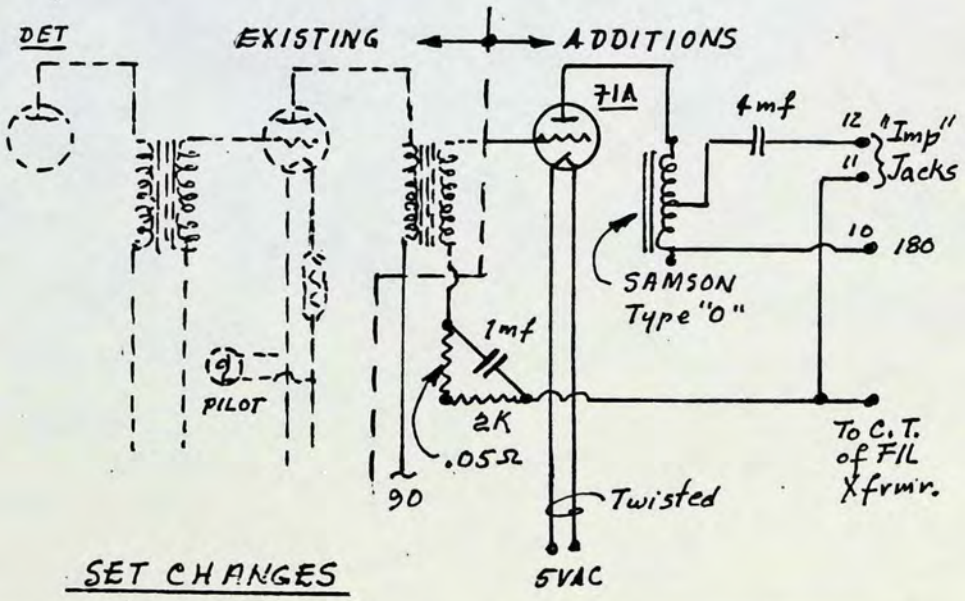
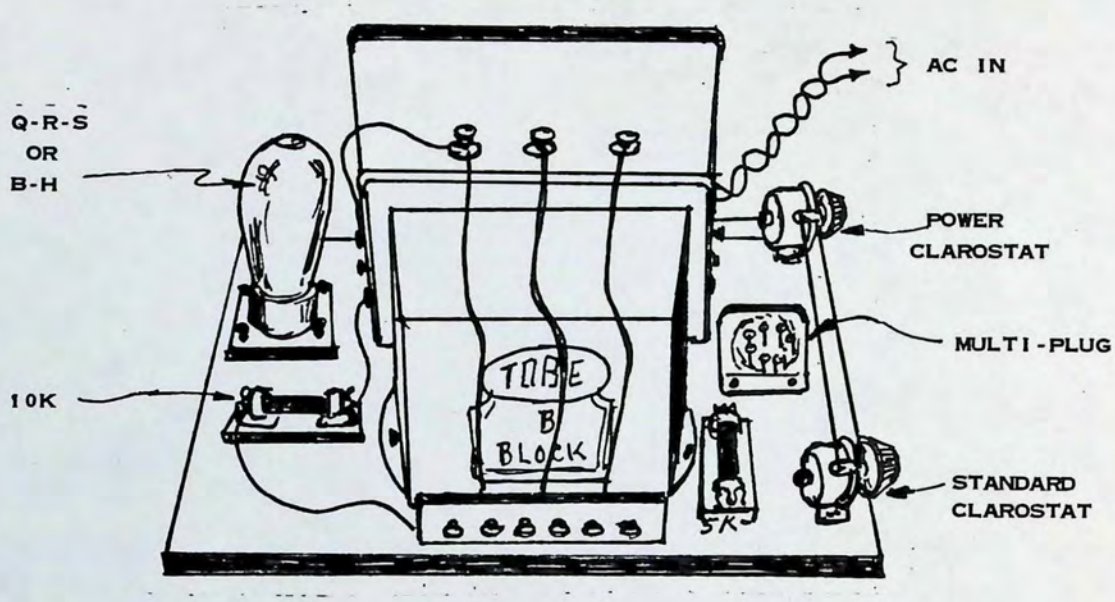
ELECTRIFYJNG THE FIRST "Hi-Q"; 1927 (Sht.3)

PROCEDURES

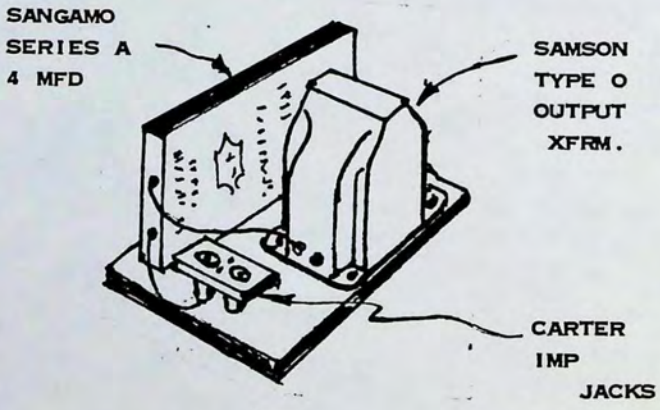
1. Remove 135V wire from binding post, and wire from "P" terminal on last AF tube socket.
2. Remove jack and install pilot-lamp bracket.
3. Remove wires connecting Amperite #3 to A+ & socket.
4. Replace Amperite with a dual resistor mounting.
5. Disconnect A- wire from binding post to AF socket, and soldering lug on shield.
6. Remove F- wire from terminal on 2nd AF xfrmr.
7. Connect B- binding post to both terminals of resistot blk
8. Connect F- terminal of 2nd AF xfrmr. to resistor block terminal nearest xfrmr. (see Sht. 2), and insert the 50K resistor.
9. Mount 1mfd condenser on baseboard opposite resistor.
10. Connect one condenser terminal to resistor mounting that is connected to the F- terminal of AF xfrmr.
11. Connect remaining resistor terminal to C- post (#6).
12. Double conductor lamp cord, 2' long, connected to last AF tube socket for power supply.
13. (See Step 11) Run a branch wire from to the unconnected terminal of the 1mfd condenser.
14. Mount tip jacks on a Bakelite strip and secure.
15. Refer to sketch below.



ELECTRIFYING THE FIRST "Hi-Q", 1927; Sht. 4




THE AC POWER SUPPLY



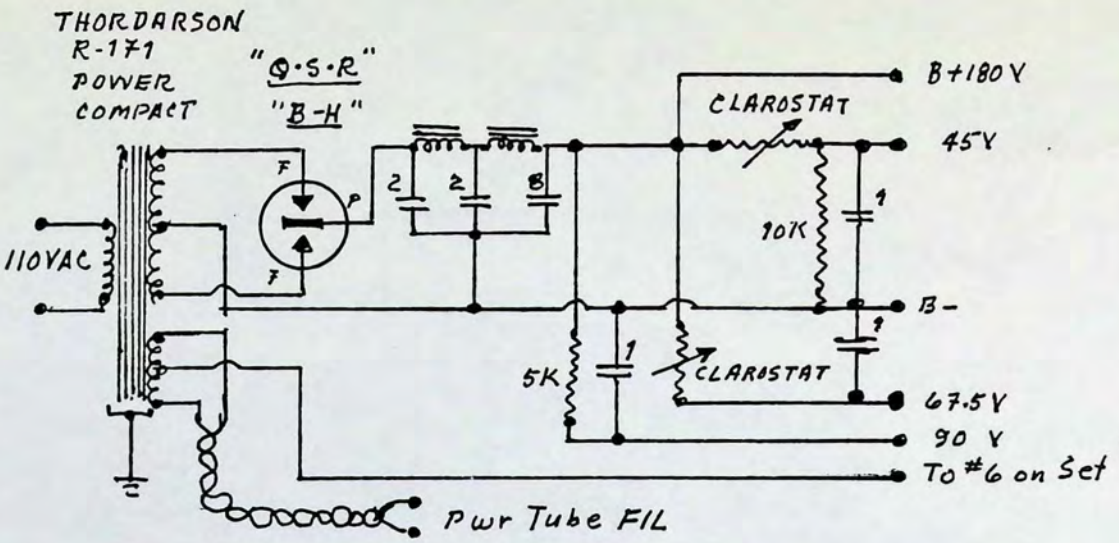

PARTS LIST

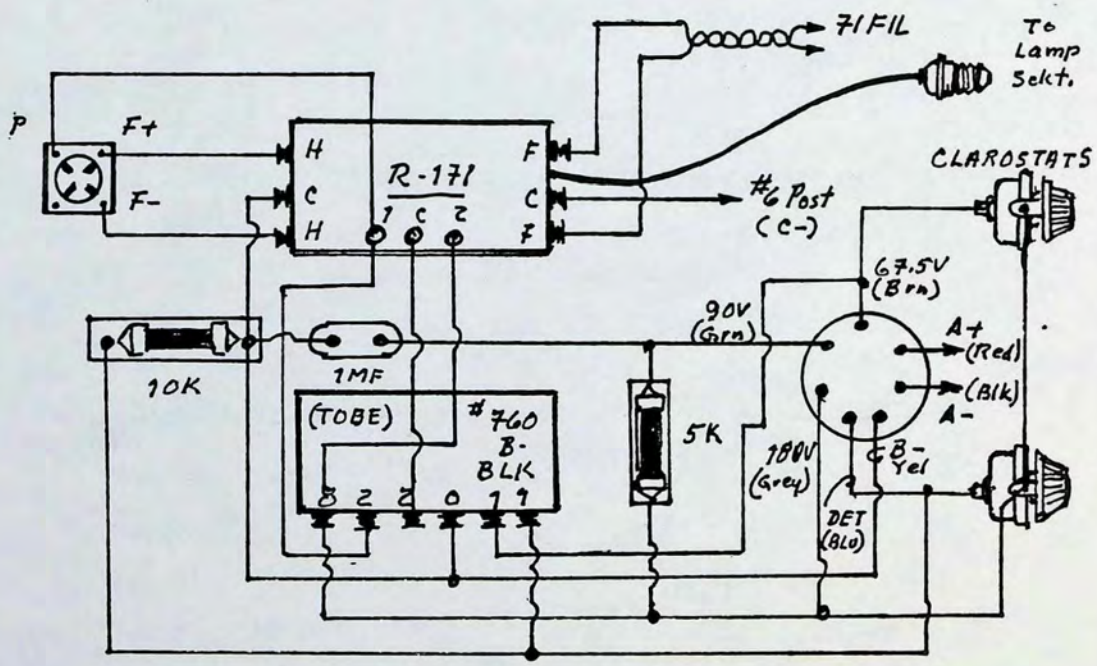
Dual-Resistance Mounting.
1 mfd, 400V Condenser.
50K-ohm resistor.
2K-ohm resistor.
Pilot-lamp socket.
Brass Angles ½" x ½".

Plus items shown.

(RB 3-27)

ELECTRIFYING THE FIRST "Hi-Q"; 1927 (Sht. 5)

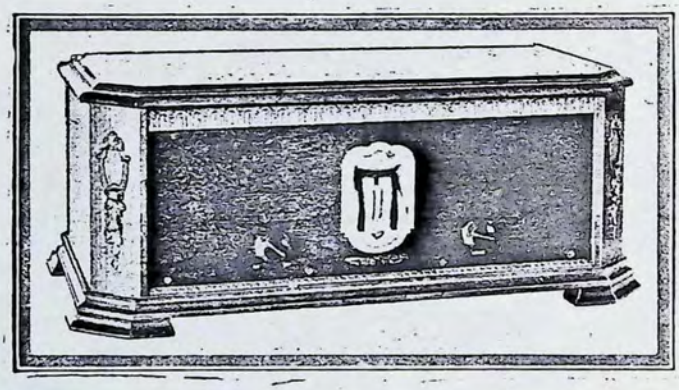


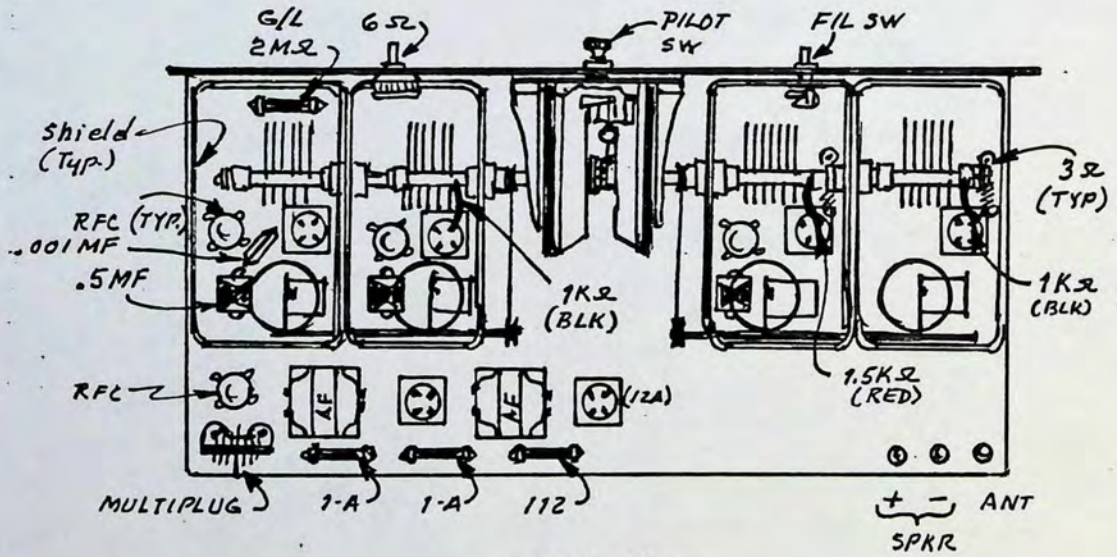




A- to A- post on storage battery.
A+ to #1 terminal on relay.
Baseboard = 7"x9"x½".

(Sht.1)

# Hammarlund
## ROBERTS
## Hi-Q* SIX

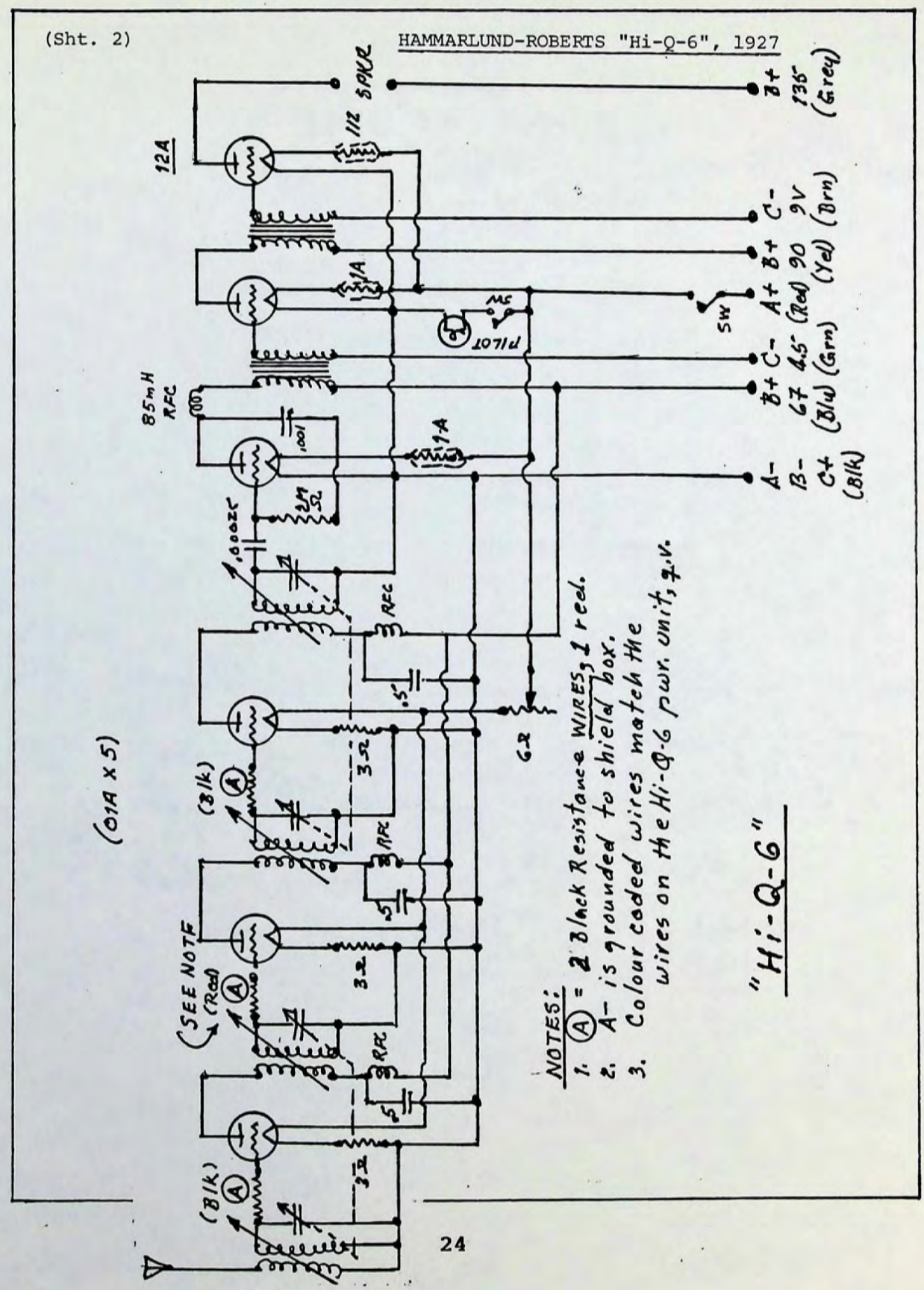





PLAN VIEW

(Optional SAMSON AF Output xfrmr. Not Shown.)

(CB1-28)


(Sht. 2)
HAMMARLUND-ROBERTS "Hi-Q-6", 1927
SPKR
112
12A
B+ 135 (Grey)
C- 9V (Brn)
A+ B+ 90 (Yel)
C- A+ 45 (Red)
B+ 67 (Blu)
C+ (Grn)
A- (Blk)
B-
C+ (Blk)
SW
PILOT
112A
85mH RFC
.001
.0002
250Ω
112A
RFC
.5
3Ω
6Ω
(Blk)
SEE NOTE (Red)
(6 IA x 5)
NOTES:
1. Ⓐ = 2 Black Resistance WIRES, 1 red.
2. A- is grounded to shield box.
3. Colour coded wires match the wires on the Hi-Q-6 pwr. unit, q.v.
"Hi-Q-6"

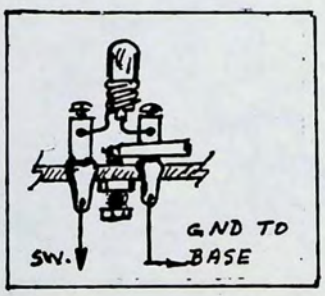
## HAMMARLUND-ROBERTS "Hi-Q-6", 1927; Sht. 3

### Major Parts List

1. Hammarlund Double Dial Assembly.
2. " .0005MFD Variables, w/ 4 shaft cplrs.
3. " Hi-Q RF Transfprmers (4).
4. " RFC 85 mH (4).
5. Samson HWA-3 AF Transformers.
6. " Output Transformers (Optional).
7. " Symphonic AF Transformer.
8. Ce-Co Tubes (5) 01A; 12A.
9. Acme 0.5 MFD By-Pass (3).
10. Yaxley Cable Plug #660.
11. Benjamin #9040 Sockets (6).
12. Aluminum Shield Boxes (4).
13. Grid Biasing Resistor Wires, 3-ohms (3).
14. Cam-operating Assembly (2).

Panel = 7" x 21" x 3/16" Micarta.

Steel Cabinet by Van Doorn.

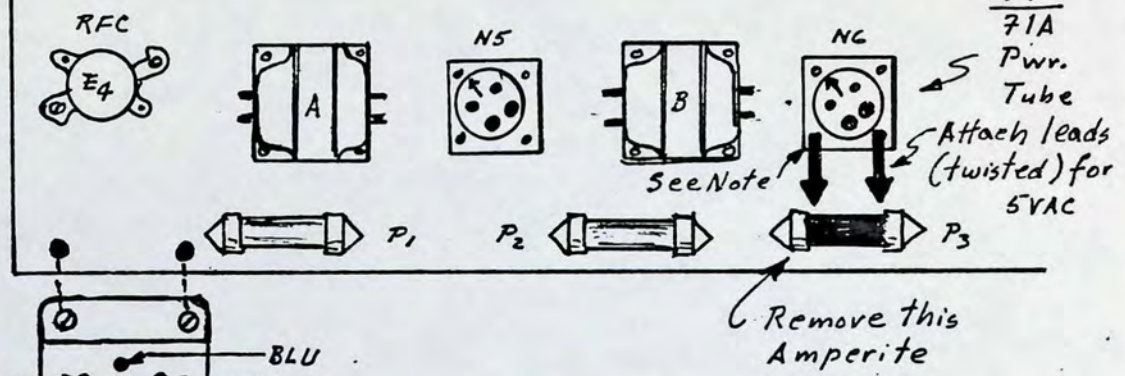


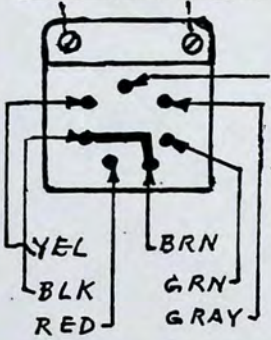

PILOT LAMP DETAIL

This was a surprisingly primitive method for securing a pilot lamp. It is suggested that you replace it with a more modern configuration.

(Sht. 3) HAMMARLUND "Hi-Q-6" POWER SUPPLY, 1928

## CHANGES REQUIRED TO "HI-Q-6" FOR POWER UNIT



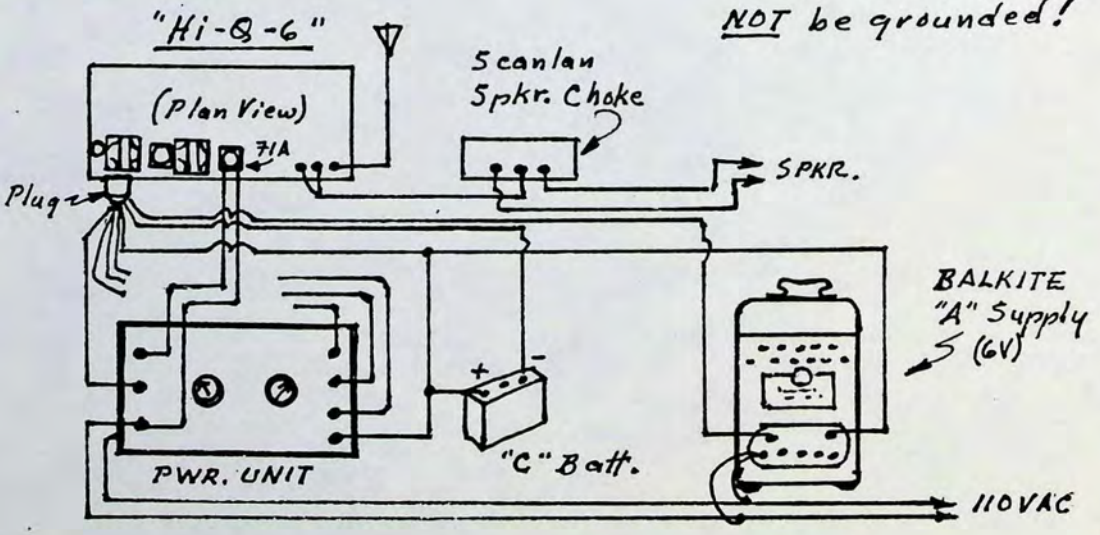




MULTIPLUG

Add Jumper as shown btwn. BRN & BLK Pins.

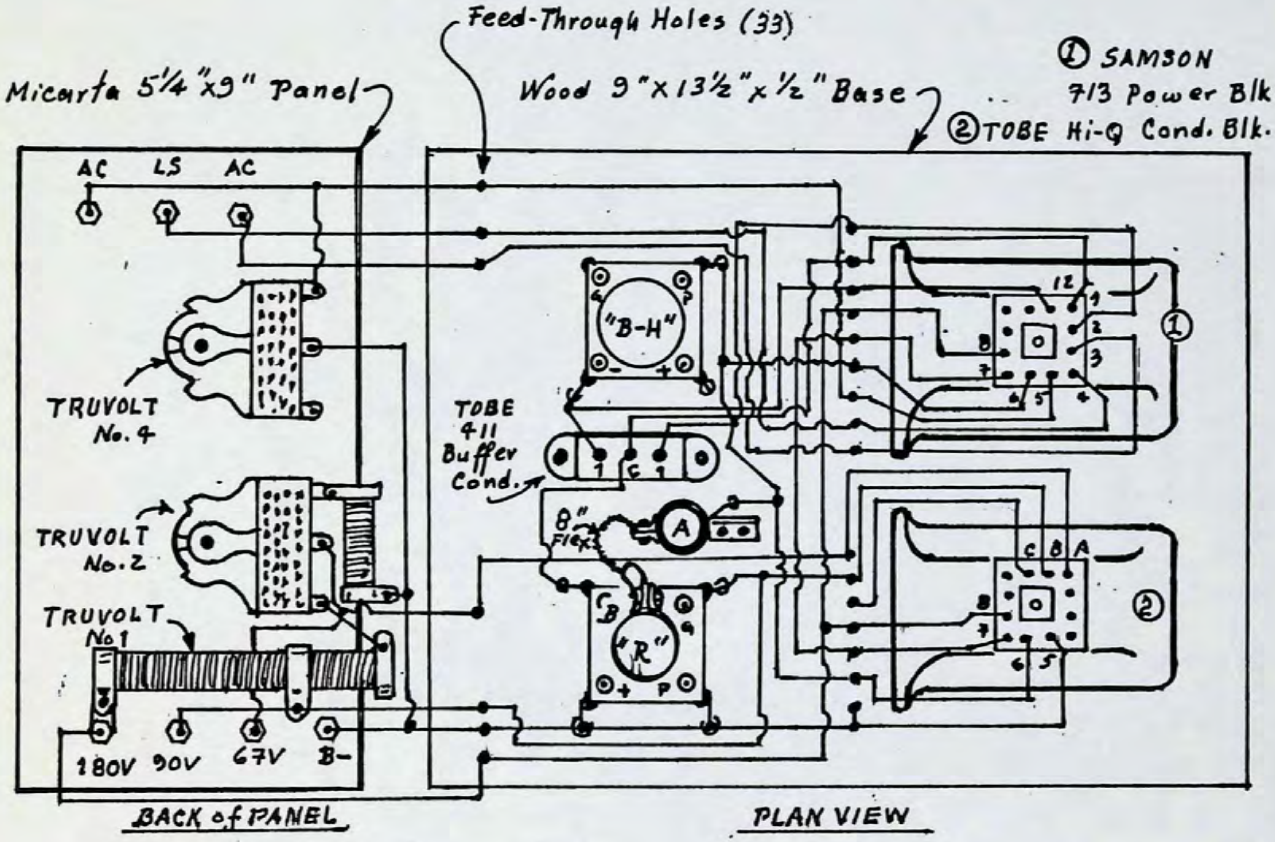
Designations above are original Hammarlund designations on the "Hi-Q-6" blueprint.

NOTE: Disconnect screw holding FIL terminal to chassis. This terminal must NOT be grounded!




ORIGINAL POWER HOOK-UP

(1928)



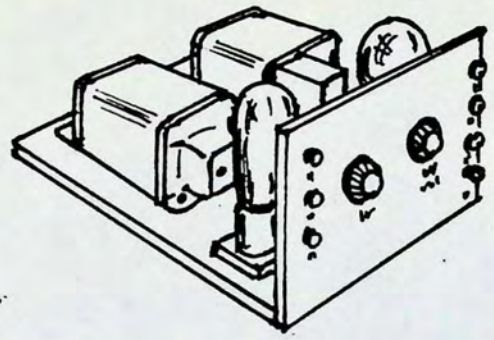

71A Power Tube Assumed, in Receiver.
A = Electrad Truvolt #3, Vertically Mounted.
B = Fahenstock "R" Clamp.
"R" = Raytheon "Glow-Tube" (voltage regulator): an 874 may be used.

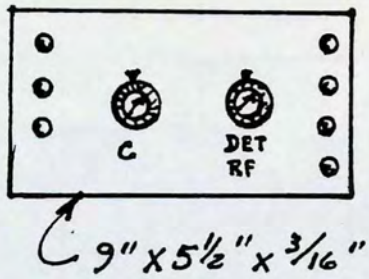
WIRE CODE:

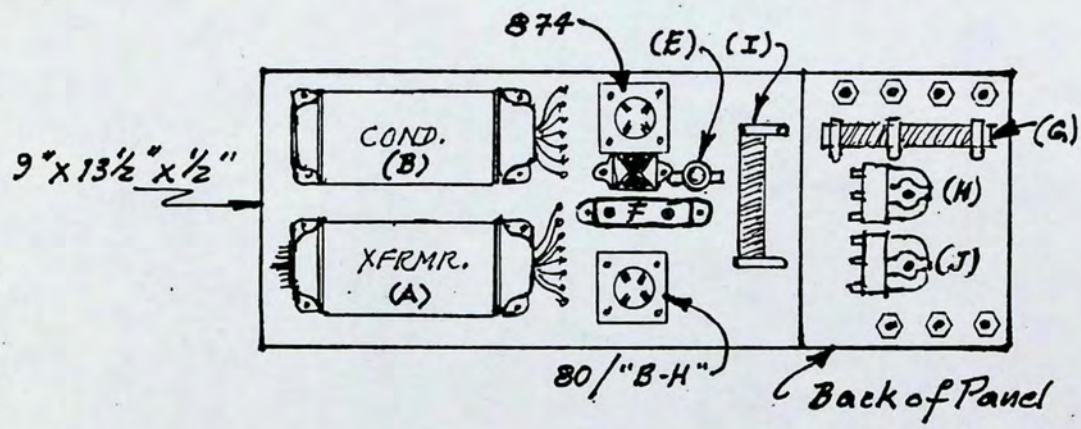
| | |
|---|---|
| B+ 180V = Grey | B+ 67V = Blue |
| B+ 90V = Yellow | B- = Black |
| C- = Green | FIL C.T. = Brpwn |

HAMMARLUND-ROBERTS "Hi-Q-6" POWER SUPPLY: Sht. 2

HAMMARLUND-ROBERTS "Hi-Q-6" POWER SUPPLY, 1928





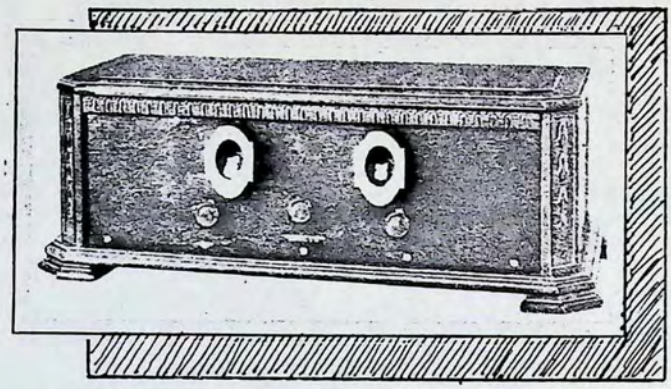



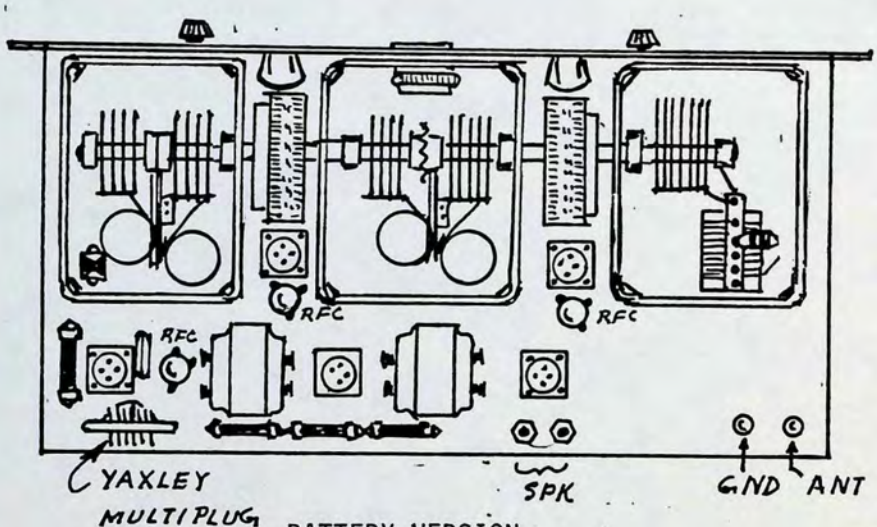

MAJOR PARTS LIST

(A) Samson Power Block Type 713.
(B) Tobe "Hi-Q" BC Condenser Block.
(E) Electrad Turvolt Resistor #3.
(F) Tobe Dual Condenser #411 (0.1 MF x 2).
(G) Electrad Truvolt #1 Tapt Resistor(*).
(H) " " #2 Resistor. (*)
(I) " " Variable W.W. Resistor.(*)
(J) " " #4 Resistor. (*)

(*) = Combined kit by Electrad for the Hi-Q-6 power supply.

HAMMARLUND-ROBERTS "Hi-Q-29", 1928; Sht. 1

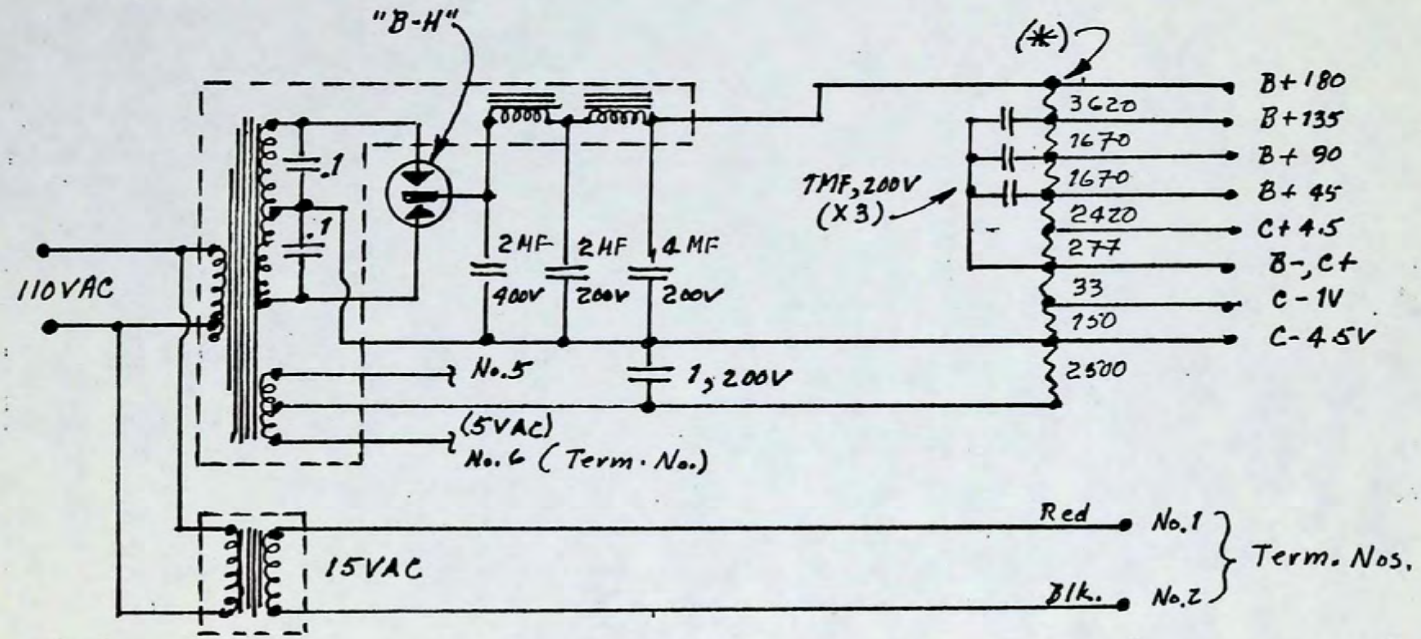





BATTERY VERSION
(Also Called "Master Hi-Q")

MAJOR PARTS:
(5) Hammarlund ML-17 Variables.
(3) " RFC-85.
(2) " SDW Drum Dial (Walnut).
" Hi-Q-29 Coil Set.
(2) Thordarson R-300 AF Transformers.
(3) Amperites 1-A.
Yaxley Multi-plug.

(CB Win-29




HAMMARLUND-ROBERTS "Hi-Q-29" AC VERSION POWER UNIT

FIL Transformer
Thordarson T-2610

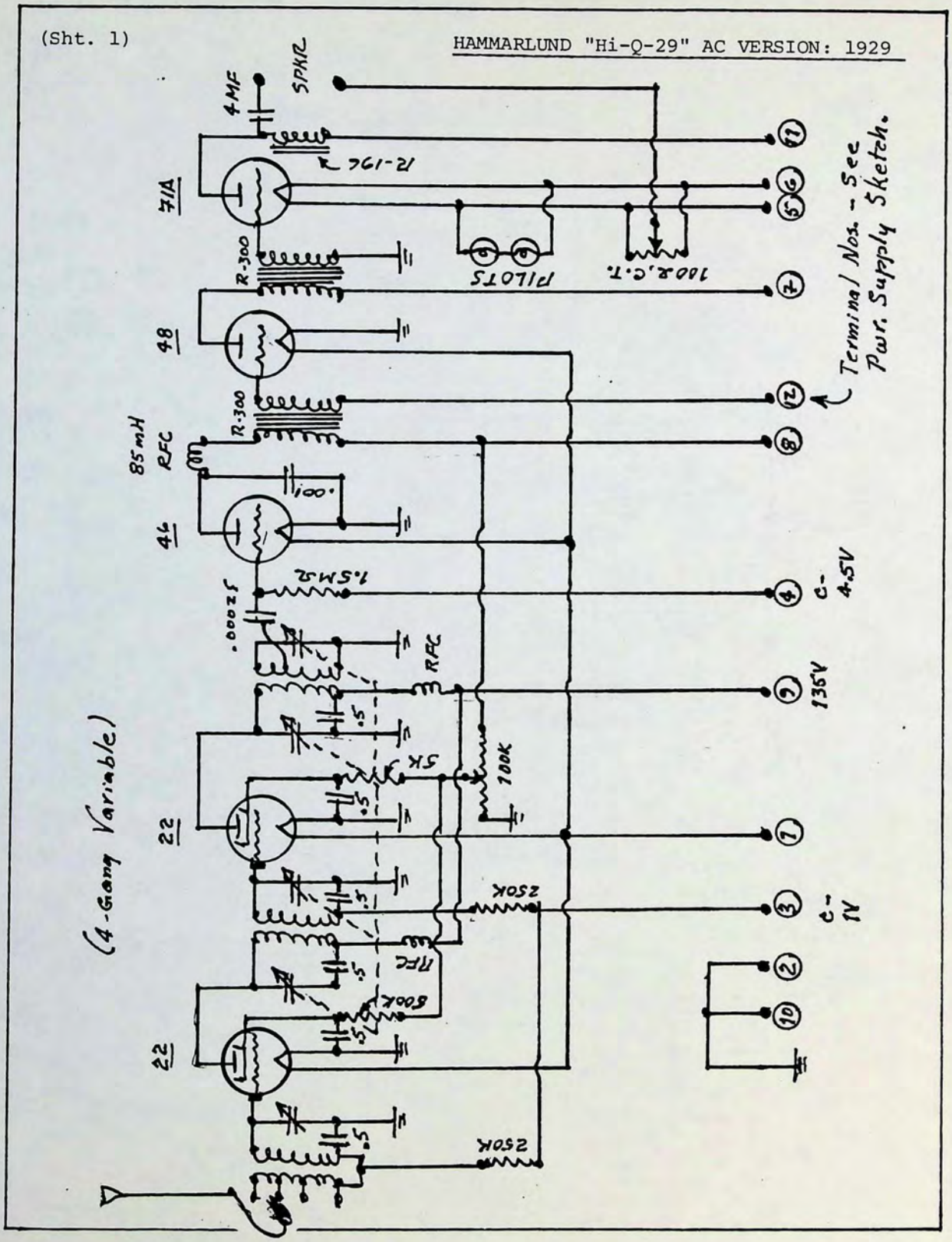
(*) = Electrad Truvolt
Hi-Q-29 Voltage Divider.

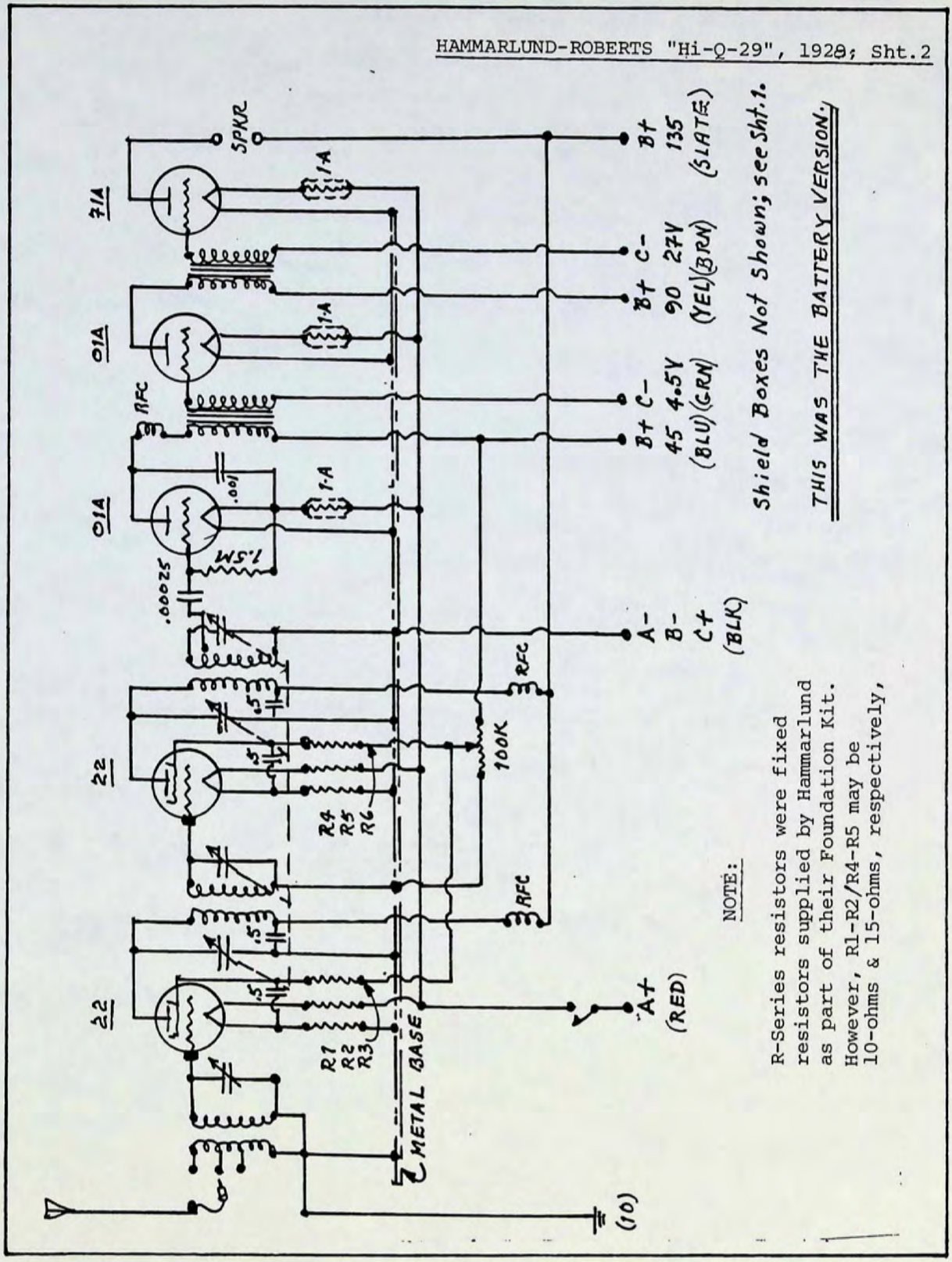
Parvolt condensers used,
made by Acme.

WIRE COLOUR & TERMINAL NOS.

| | |
|---|---|
| B+ 180V = Brown | Terminal 11 |
| B+ 135V = Slate | " 9 |
| B+ 90V = Yellow | " 7 |
| B+ 45V = Blue | " 8 |
| C+ 4.5V = Blk/Grn | " 4 |
| C+,B- = Green | " 10 |
| C- 1V = Red/Grn | " 3 |
| C- 4.5V = White | " 12 |

(CB SUM-29)


(Sht. 1)
HAMMARLUND "Hi-Q-29" AC VERSION: 1929
4MF
SPKR
12-12C
71A
R-300
PILOTS
180 R.C.T.
48
R-300
85mH RFC
46
100.
.00025
1.5MΩ
RAC
5K
100K
22
250K
RFC
.5
800K
22
250K
(4-Gang Variable)
Termina/ Nos. - See Pwr. Supply Sketch.
C- 4.5V
135V
C- 1V


HAMMARLUND-ROBERTS "Hi-Q-29", 1928; Sht.2
SPKR
2-11A
2-01A
2-01A
2-22
2-22
RFC
.001
.00025
1.5M
1-A
.5
R1
R2
R3
R4
R5
R6
100K
METAL BASE
(10)
A+ (RED)
A- B- C+ (BLK)
B+ C- 45 4.5V (BLU)(GRN)
B+ C- 90 27V (YEL)(BRN)
B+ 135 (SLATE)
Shield Boxes Not Shown; see Sht.1.
THIS WAS THE BATTERY VERSION.
NOTE:
R-Series resistors were fixed resistors supplied by Hammarlund as part of their Foundation Kit. However, R1-R2/R4-R5 may be 10-ohms & 15-ohms, respectively,

(Sht. 3)

## HAMMARLUND "Hi-Q-29" AC VERSION: 1929

### MAJOR PARTS LIST

(5) Hammarlund ML-17 350mmf Variables.
(1) " Hi-Q-29 Coil Set.
(2) " Drum-Dials (Walnut).
(3) " RFC-85 Chokes.
(2) Thordarson R-300 AF Xfrmrs.
(1) " R-196 Choke Coil.

### GENERAL NOTES

The circuit contained two double-tuned RF xfrmrs., each tuned by a midget variable.

All four tuned circuits were identical.

Each circuit was enclosed in an aluminum shield box, secured to the metal chassis. See the Battery Model for configuration, which was the same.

Connexion posts on the original power supply were Fahenstock clips, and accepted the free end leads from the Yaxley 12-wire power cable from the set.

Tubes such as the 10 and 50 could be used in place of the 71 or 71A.

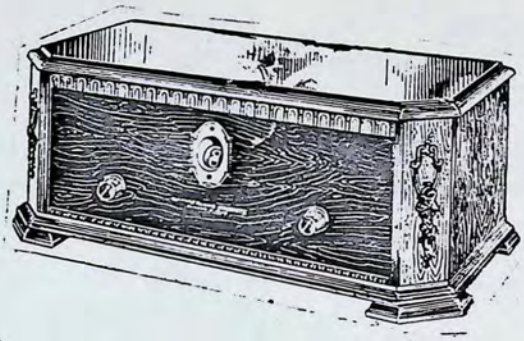
ARCTURUS tubes were specified originally, and operated from a FIL or HTR potential of 15 VAC, consuming 0.35A.

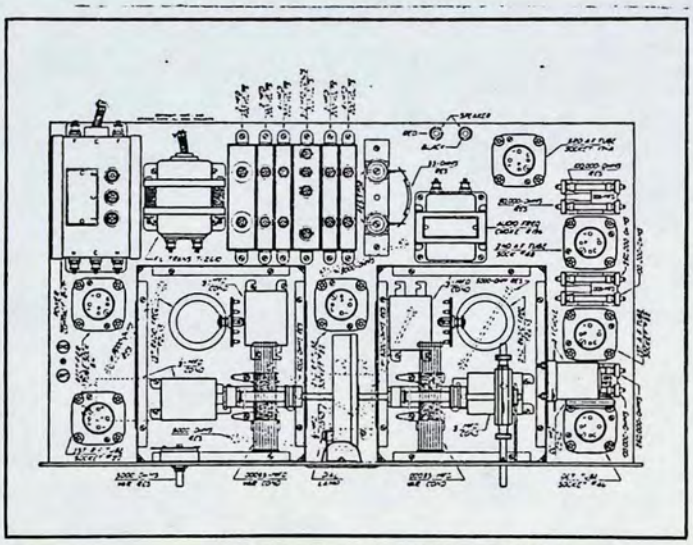
* * *
* *
*

NOTES

"Hi-Q-29" AC JUNIOR, 1929

(Shf.1)





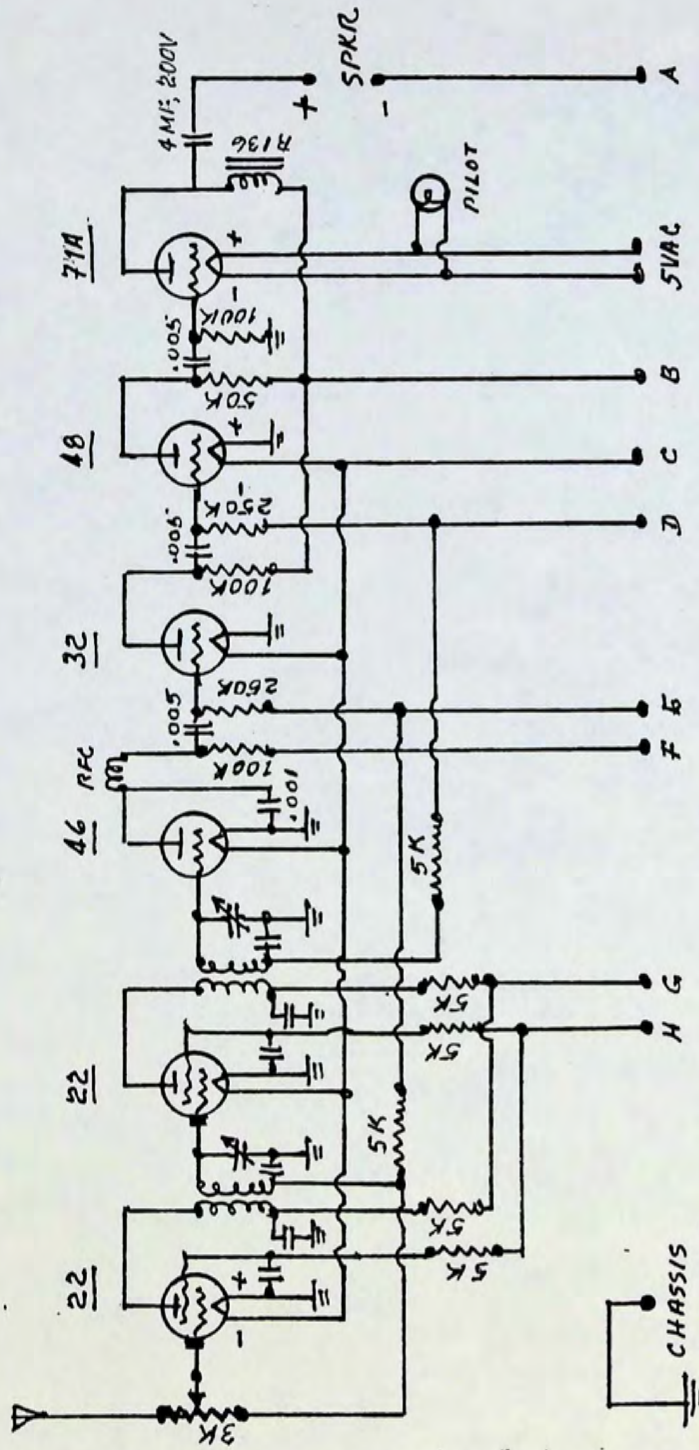
## MAJOR PARTS LIST

1. HAMMARLUND ML-17 350 mf Variable.
2. " SGT-17 S.G. RF Xfrmr.
3. " RFC-85.
4. " SDW Knob-Control Drum Dial.
5. THORDARSON R-171 Power Compact.
6. " R-196 Choke Coil.
7. " T-2610 FIL Xfrmr., 15V.
8. CARTER PT-3M Tapered VOL Control, 3K.
9. DURHAM "Powerohms" 1W, 100K.
10. " " 1W, 50K.

(CB Spr-29)

"Hi-Q-29" AC JUNIOR, 1929

(Sht.2)

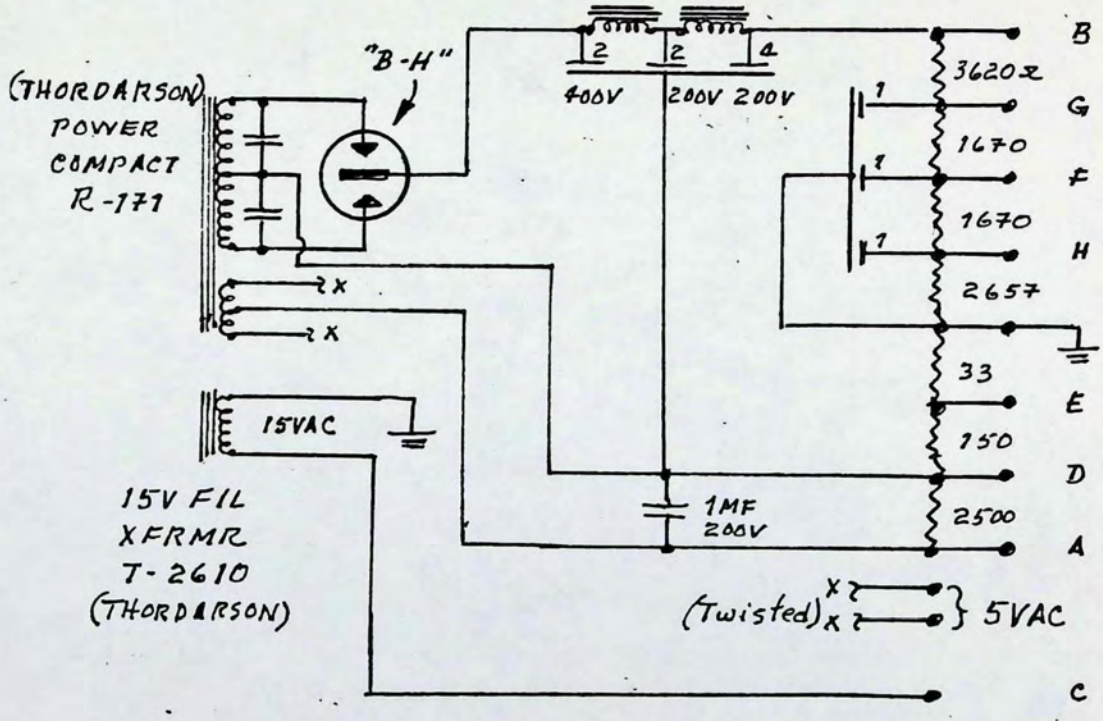



NOTES

1. All by-pass = .5 mfd. (6)
2. 350 mmf Variables are ganged.
3. 32 & 48 Tubes = Hi-mu.
4. See Sht. 3 for Power Unit: units for other "Hi-Q" sets cannot be used w/ this receiver, altho' the Thordarson Power Compact R-171 is the same.
5. ARCTURUS tubes specified originally operated @ 15VAC.

HAMMARLUND-ROBERTS "Hi-Q-29" AC JUNIOR: Sht. 3

THE AC JUNIOR POWER UNIT

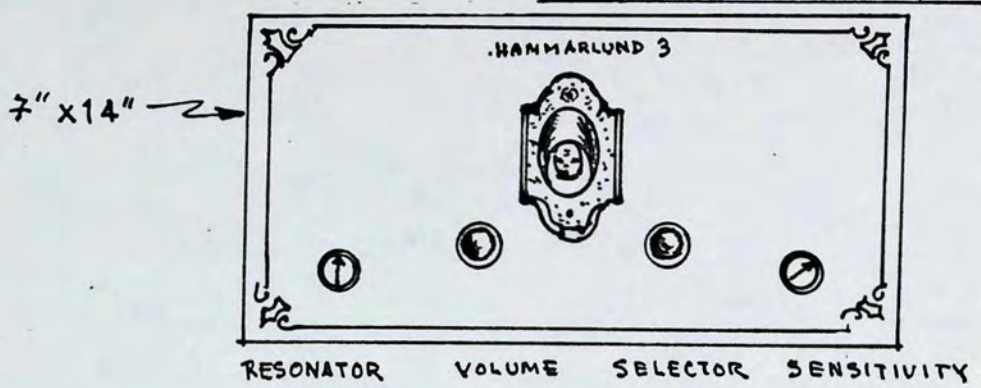


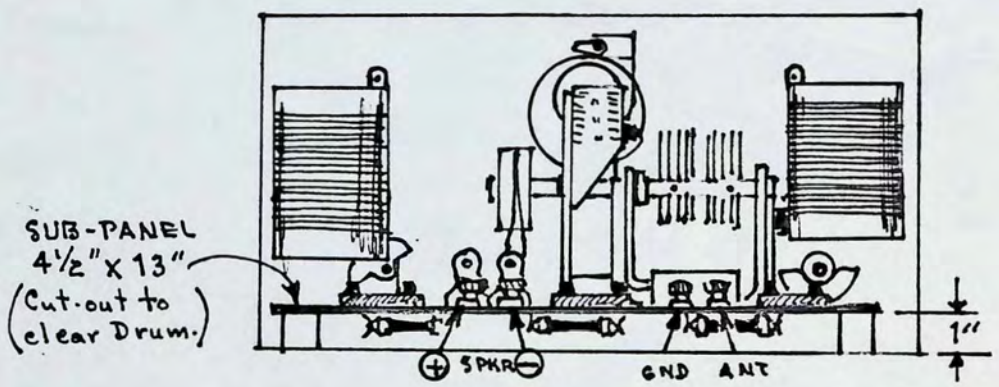

Unit was built on the Thordarson Power Compact R-171, although the R-210 chassis may also be used.

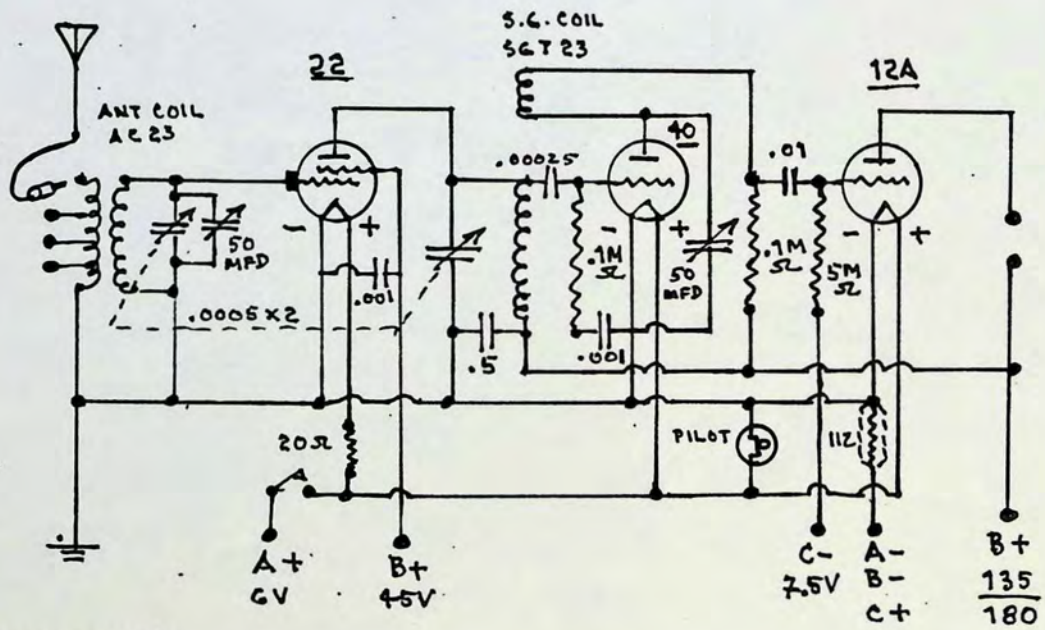
Thordarson FIL Transformer T-2610.

Chassis was ground.

HAMMARLUND SCREEN-GRID 3, 1928



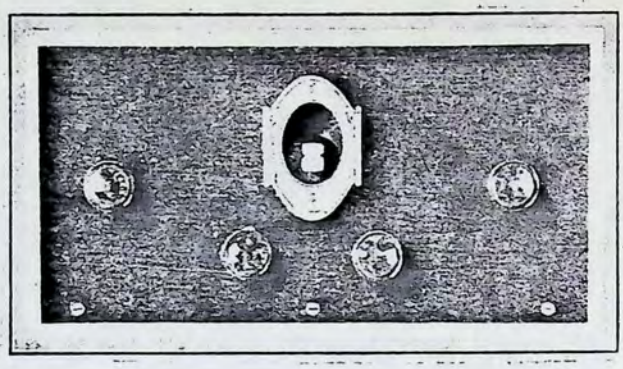



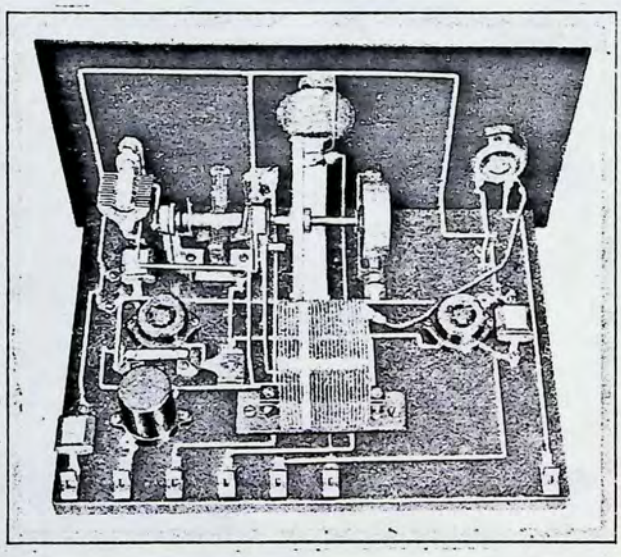




(RW 11-10-28)

(Sht. 1)

HAMMARLUND SW CONVERTER & RECEIVER: 1929



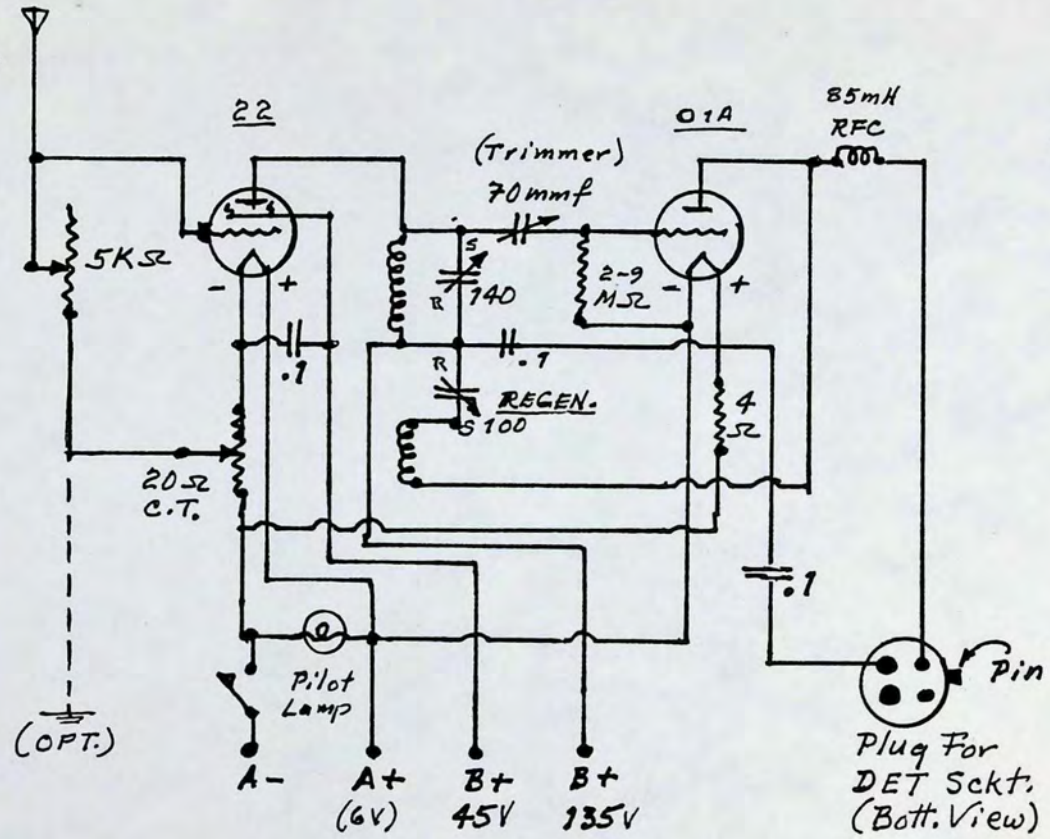


## MAJOR PARTS LIST

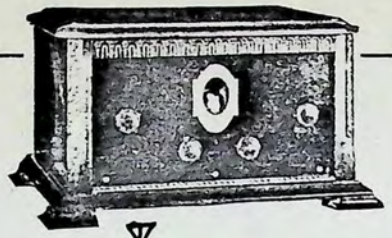
(1) Hammarlund ML-7, 140 mmf Variable
(2) " SWC-3 Coil Set
(3) " SDW Drum-Dial Assy.
(4) " EC-70 "Equalizer"
(5) " RFC-250
(6) " MC-23 Midget Variable
(7) " SWAP Adapter Plug & Cable
(8) Electrad Type P "Tonotrol"
(9) (3) .1 Condensers. (10) 20Ω C.T. & 4Ω Resistors (1 ea.)

(CB-Sum-'29)

(Sht. 2) HAMMARLUND SW CONVERTER & RECEIVER: 1929

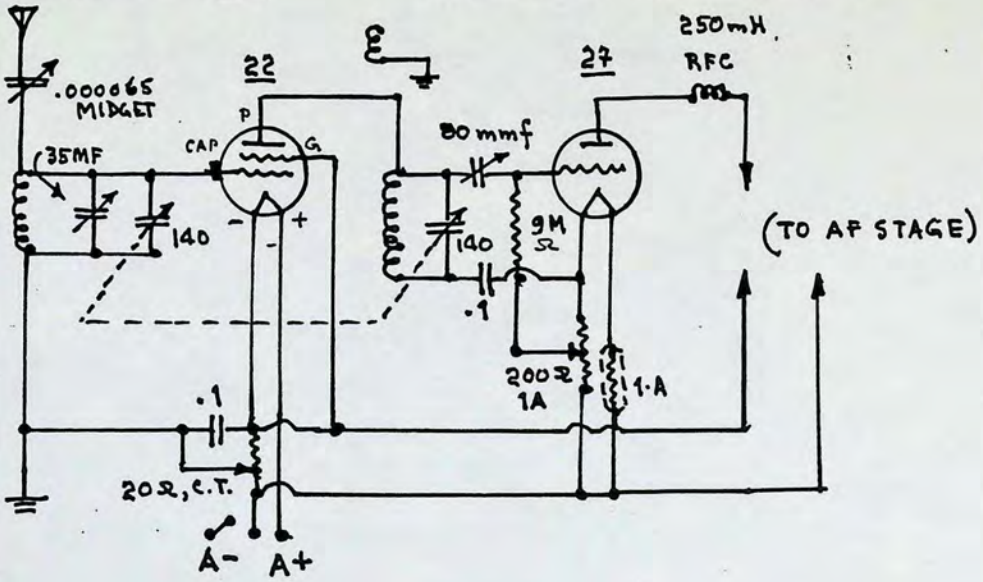


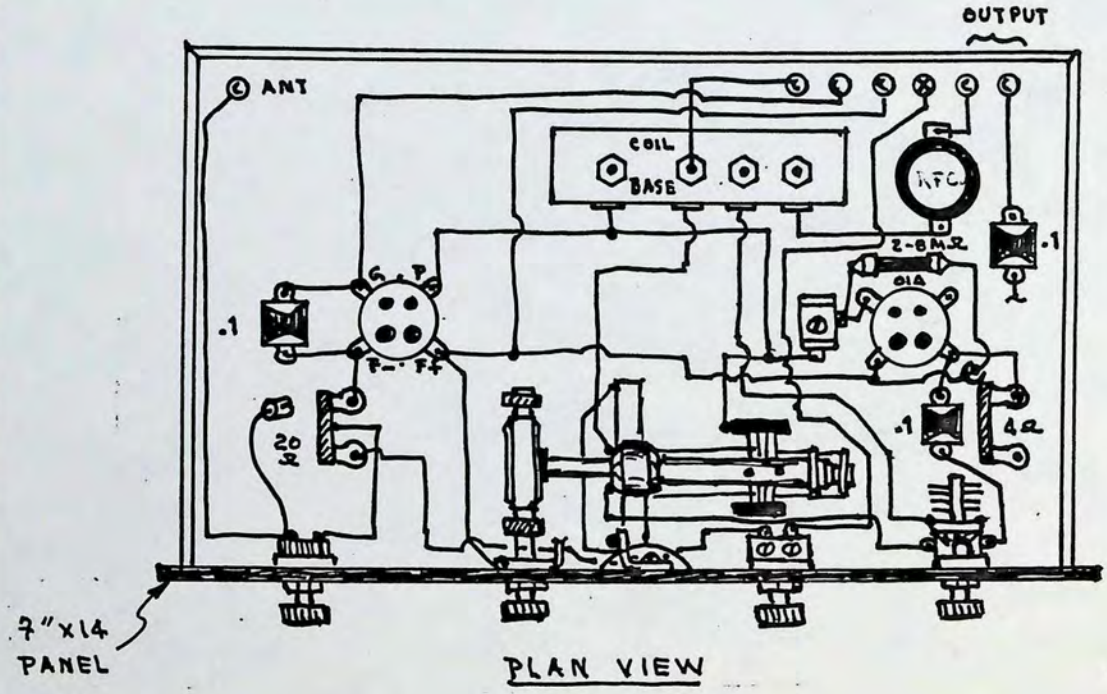

NOTES:
1. Panel = 7" x 14" x 3/16".
2. Baseboard = 9" x 13" x 3/4".
3. Set will not radiate.
4. Supplied as a complete kit in 1929, along with the '29 edition of Hammarlund SW Manual.
5. Battery power was recommended, with "A" supply permanently attached. May be used "as-is" or as a SW receiver with phones.
6. CW may be received with adapter in non-regenerative mode.



HAMMARLUND SW CONVERTER/RCVR., 1929

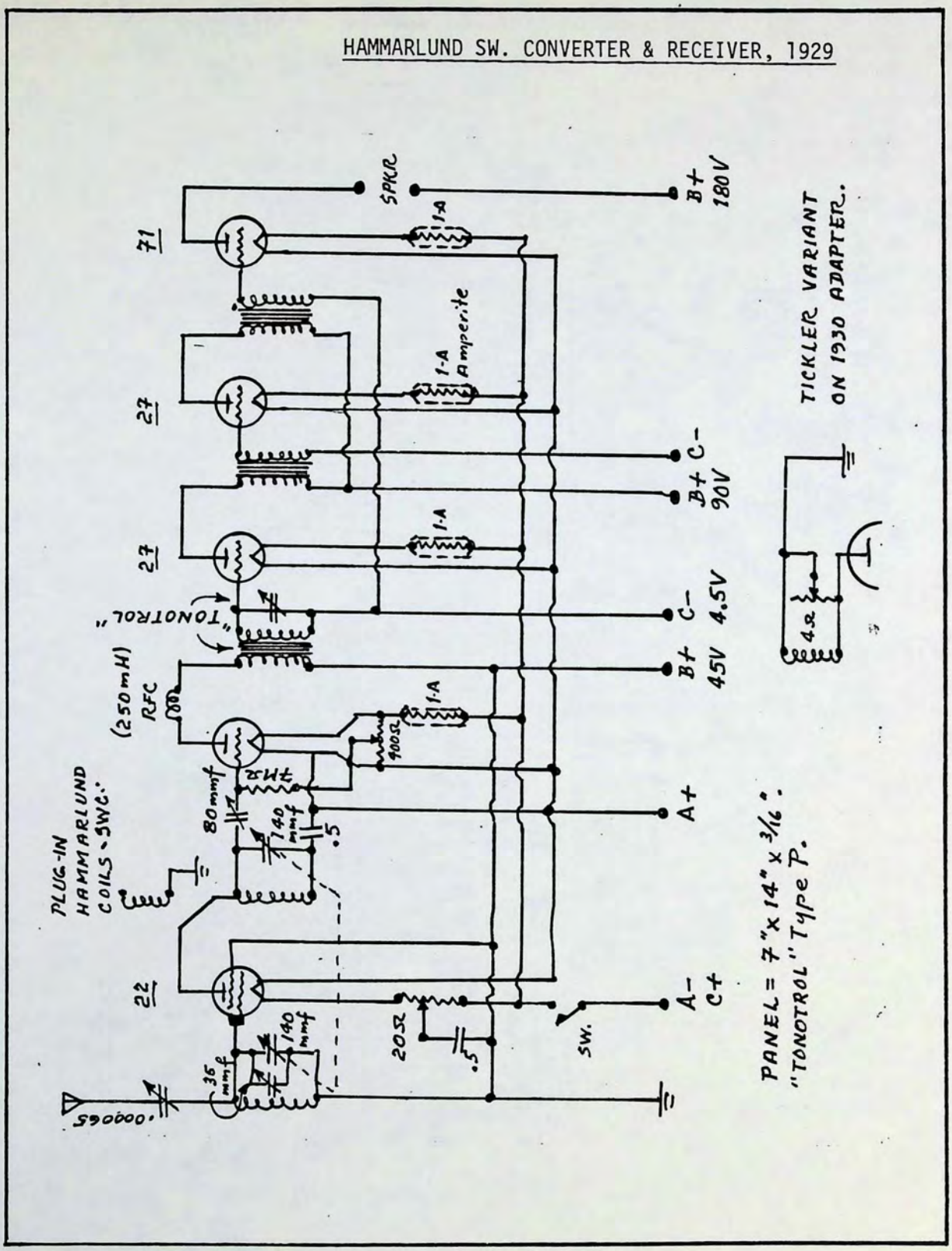
(Original design was as a tuner - AF output stages were required.)




PLAN VIEW

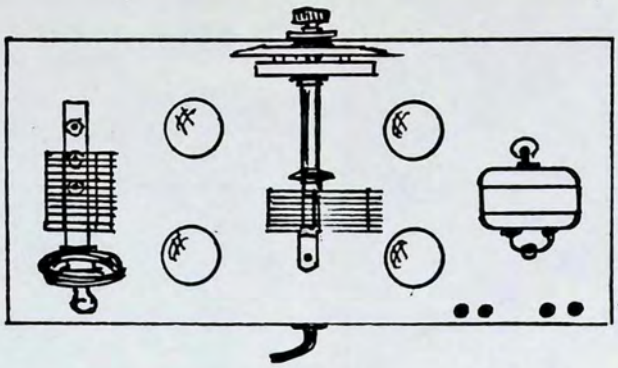
(RW 3-2-29)


HAMMARLUND SW. CONVERTER & RECEIVER, 1929
SPKR
B+ 180V
71
1-A
27
1-A Amperite
27
1-A
B+ C- 90V
"TONOTROL"
B+ C- 45V 4.5V
(250 mH) RFC
1-A
400Ω
80 mmf
2 Mt.
140 mmf
.5
A+
PLUG-IN HAMMARLUND COILS - SW'C.
22
140 mmf
35 mmf
590000.
20Ω
.5
SW.
A- C+
PANEL = 7" x 14" x 3/16".
"TONOTROL" Type P.
TICKLER VARIANT ON 1930 ADAPTER.
4Ω

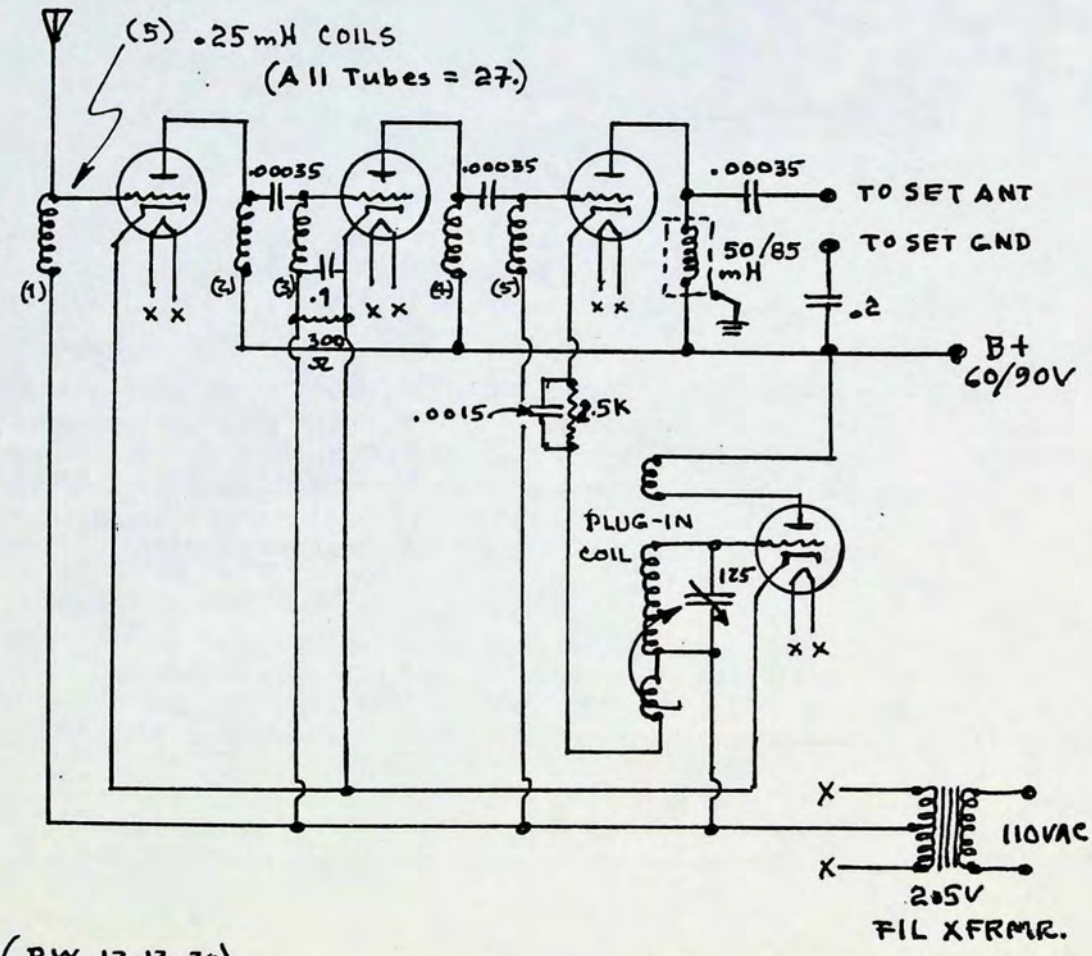
HAMMARLUND "DeLuxe" SW. CONVERTER, 1930

AL. AL.
BUD-TYPE
CHASSIS ~
5½" x 11" x 2"

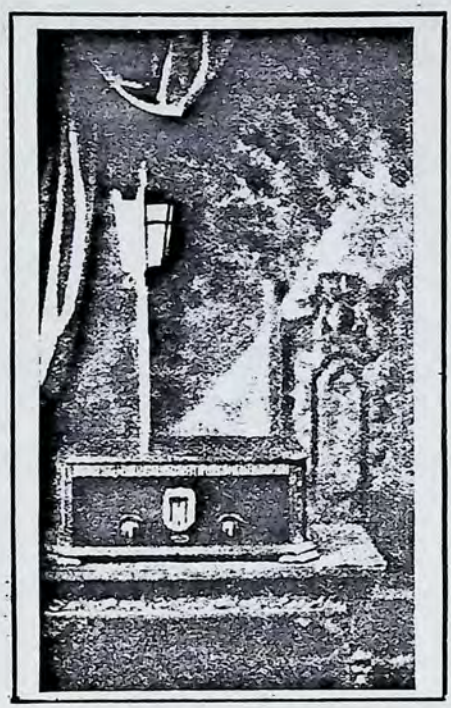
(4) BINDING POSTS.
HAMMARLUND
LWT-4 COILS.
FAN DIAL.
MLW-125 VARIABLE.



(15 TO 110 METERS)




(RW 12-13-30)



## EVOCATIONS....

You might want to compare the cut shown at left with the frontispiece of of this volume, as they share a common derivation that is worth mentioning.

Both cuts are interesting in them selves, aside from their obvious purpose. The mid-Twenties were witness to the twilight of what was called "soft-focus" photography. The "Hi-Q-6" shown in both cuts was shot in soft-focus.

Soft-focus photographic portraits were in vogue, and many still believed that soft-focus was more flattering to their private image of themselves. The belief that soft-focus was also more aesthetically satisfying died hard, as it was supposed to lift the subject on to the level of an artistic experience for everyman.

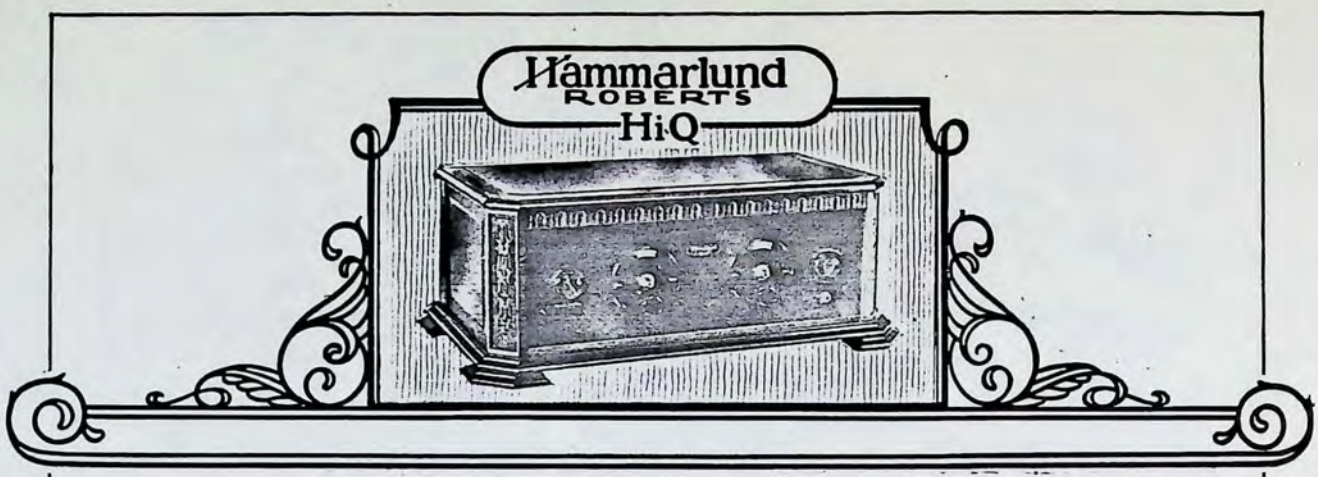
With every other radio manufacturer concerned only with the sharpness of detail in his adverts, the Hammarlund advert was an obvious risk that apparently paid off, as the "Hi-Q-6" in soft-focus was run in media for three years.

Another point that emphasises the above is the obvious attempt made by the photographer to create a "pretty" picture. The placement of lamp, candles, drapes, tapestried background all attest to the validity of the proposition. It was also about the time when the furniturisation of radio was taking hold of the public's imagination, and becoming accepted as part of the average American home, just as the piano was mandatory as an adjunct to every American parlour.

Such adverts were also designed to make a tacit appeal to the woman of the house, as her response to such "pretty" pictures would take place on an interior level different from that of a man. Apparently, they were a successful advertising gimmick, as the economics of radio advertising in the Twenties was not different from advertising today.

All of which tacitly suggests that the ad-agency for Hammarlund was treating Radio as a genuine sociological phenomenon - which is the basis of these writings.

* * *
* *




The adverts of early set and parts manufacturers, including jobbers, tell you a lot about the nature, philosophy, and probable integrity of the advertiser. In consequence, they are always fascinating not only for what they say, when we consider the state-of-the-art, but also for what they imply in a broader sociological context.

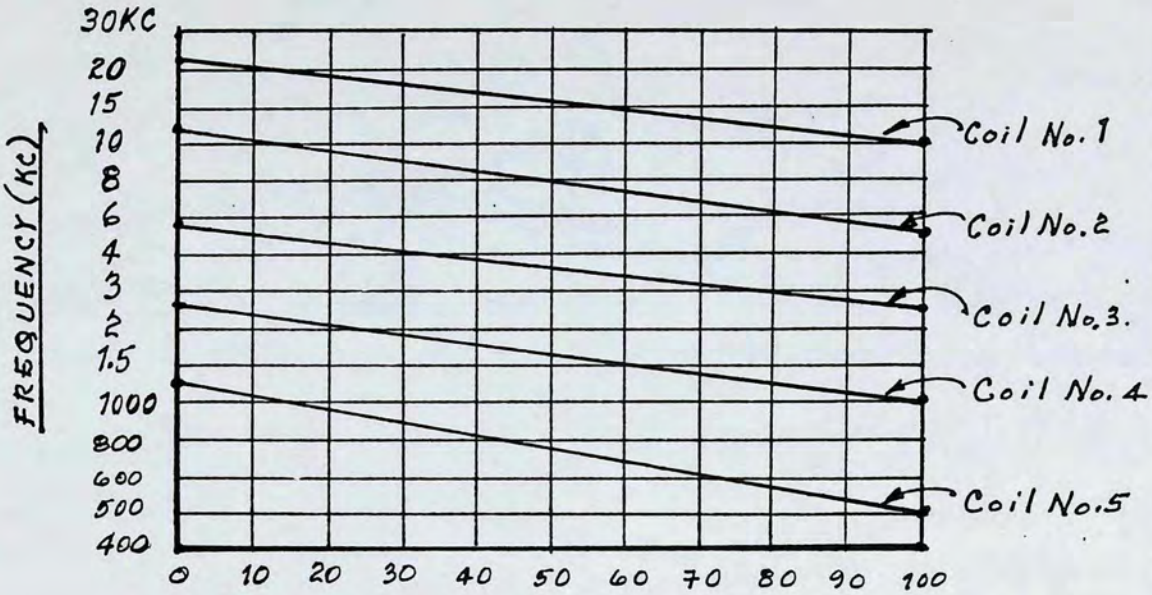
From the slam-bang adverts of shlok-shops along Cortland and Fulton Streets to the dignified and erudite adverts of the manufacturers of "Bakelite" extruded and molded shapes. Their back cover adverts which ran for years in Radio Engineering were superb examples of product illustrations and relevant copy.

HAMMARLUND and NATIONAL both began business as manufacturers of parts, components, and accessories. Despite their latter-day succes as makers of some fine ham gear in the early Thirties, their main line continued to be the manufacturing and distribution of parts, well into the Fifties. The quality of their parts was such that several commercial manufacturers of radios consistently used their parts.

The following pages depict a selexion of adverts from early radio media, which show a consistence of concept. A page of late model parts and accessories for ham gear from the early Fifties is also included, which would suggest a straight-line continuum.

* * *
* *
*

HAMMARLUND "COMET" COIL & DIAL DATA




DIAL SETTING

HAMMARLUND "COMET" RCVR.

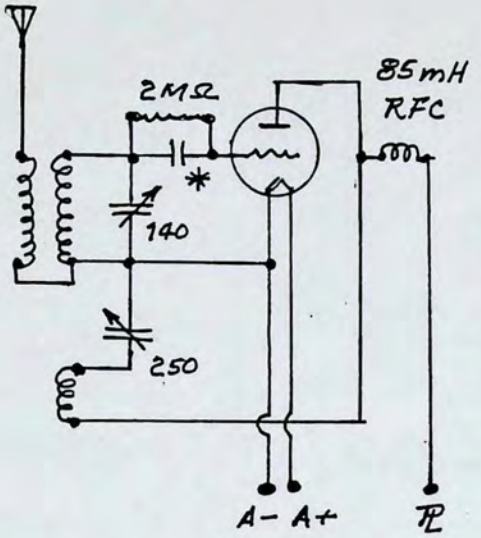
| Code No. | Range in Meters | primary | | secondary | | Length of Winding | Turns per Inch |
|---|---|---|---|---|---|---|---|
| | | Turns | Wire | Turns | Wire | | |
| 1 - Osc | 14 - 30 | 4 | #30 DS | 6 | #20 DS | 1" | 6 |
| 1 - W.L. | 14 - 30 | 4 | ↑ | 7 | ↑ | 1.167" | 6 |
| 2 - Osc | 28 - 60 | 4 | | 12 | | 1" | 12 |
| 2 - W.L. | 28 - 60 | 4 | | 14 | | 1.167" | 12 |
| 3 - Osc | 56 - 125 | 5 | | 24 | | 1" | 24 |
| 3 - W.L. | 56 - 125 | 5 | | 33 | | 1.375" | 24 |
| 4 - Osc | 120 - 300 | 10 | | 44 | #20 DS | .785" | 56 |
| 4 - W.L. | 120 - 300 | 5 | | 78 | 1/41 L | 1.393" | 56 |
| 5 - Osc | 240 - 550 | 14 | ↓ | 70 | #28 SS | 1.250" | 56 |
| 5 - W.L. | 240 - 550 | 8 | #30 DS | 114 | 10/41 L 2 BANK | 1.062" | ~ |

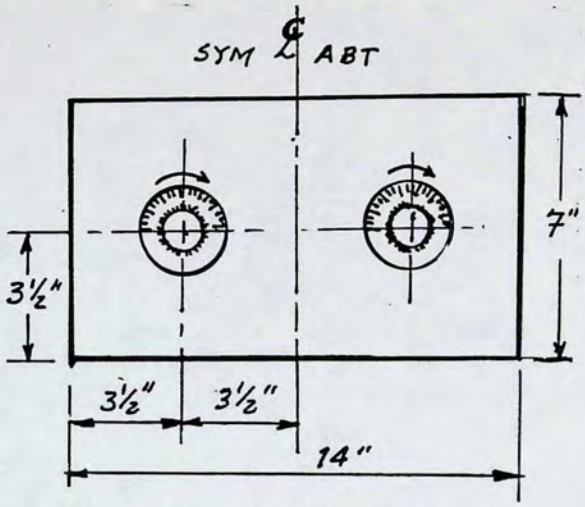
"COMET" COIL DATA

W.L. = Wave-Length

DS = Double Silk
SS = Single Silk
L = Litz. Wire

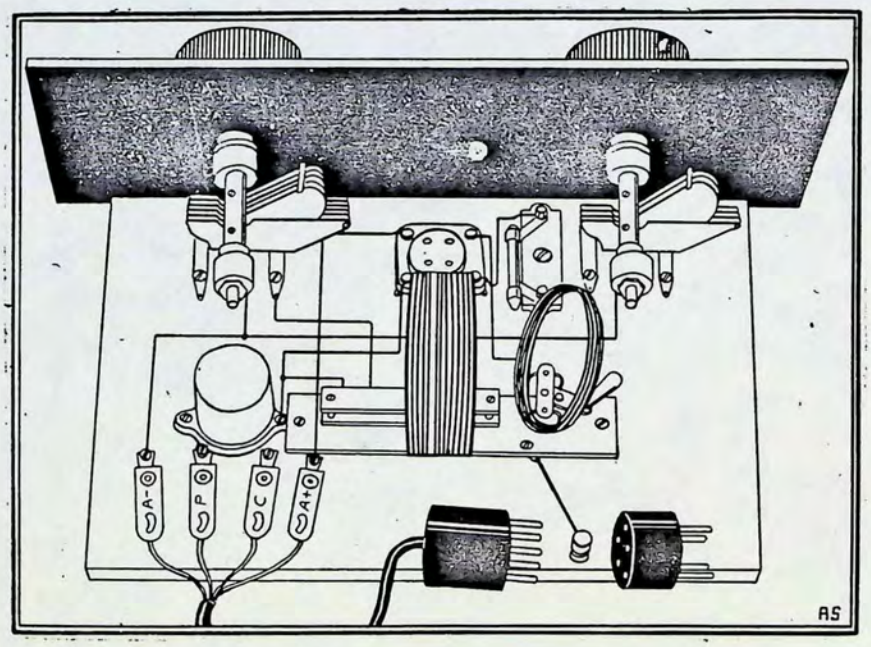
HAMMARLUND AC-DC SW ADAPTER, 1928




Sub-Panel = 7" x 12".

* = X-L "N" Vario-Denser.
Hammarlund Plug-In SW Coils.
DC Circuit Shown.




(RW 8-25-28)

(1928)

# *Created by America's Leading Manufacturers Endorsed by America's Leading Engineers*

## AND SOLD BY AMERICA'S LEADING JOBBERS!

JUST as water must find its own level, so a quality idea created by sincere minds and built of honest materials must be sponsored and sold by merchants of highest business integrity. Apply the thought to the Hammarlund-Roberts Hi-Q SIX Receiver, for this remarkable CUSTOM-BUILT Instrument has so conclusively proved its value that today its circuit and approved parts are both recommended and sold by those distributors whose names are a silent testimony of endorsement.



Practically every important radio jobber and dealer in the United States recommends the advanced Hi-Q SIX Receiver. Further than this, over 3500 professional builders find it the heart of their business. Beyond this, the records show uncounted thousands of users who have discovered in the Hi-Q SIX the *supreme instrument of the year!*

Hammarlund ROBERTS Hi-Q SIX

**HAMMARLUND-ROBERTS, INC., DEPT. T, 1182 BROADWAY, NEW YORK CITY**

Hammarlund
ROBERTS
Hi-Q

*The*

# "HAMMARLUND"

*In The*

## Hammarlund-Roberts

Pictured here are Hammarlund's contributions to the splendid success of the Hammarlund-Roberts "Hi-Q" Receiver—the supreme effort of ten leading American radio engineers.

## CUSTOM-BUILT
## *Under $100!*

As with the automobile, the best in radio must be CUSTOM-BUILT. But with this remarkable advanced "Hi-Q" Six Receiver you get CUSTOM-BUILT results without paying a CUSTOM-BUILT price.

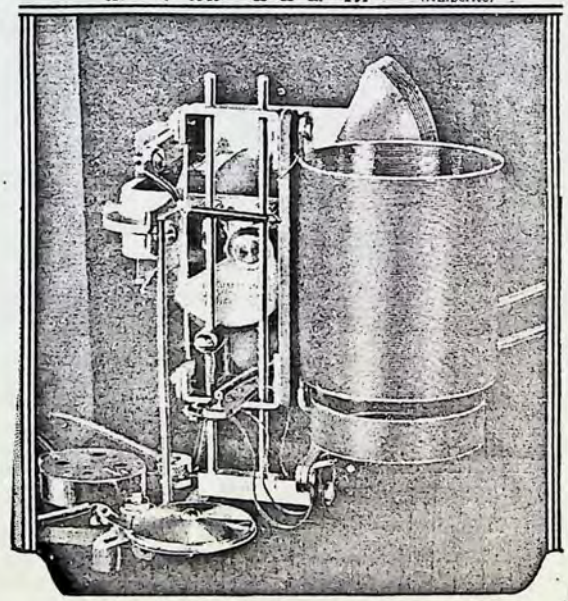
How? The approved "Hi-Q Six" Parts cost only $95.80—every component is the finest in the industry. Follow our complete 48-page illustrated Constructional Manual and put the parts together. Or have your local Radio-Trician put them together for you.

The result is a receiver that supplies a new standard of sensitivity—knife-like selectivity—utter absence of oscillation—and a quality of tone that is astounding even to experts. Send 25 cents for the Hi-Q Constructional Manual or get a copy from your dealer. Enjoy the ultimate in radio and save at least $100 over the cost of high class assembled sets. Hammarlund-Roberts Inc., 1182 Broadway, Dept. B, New York City.

Hammarlund
ROBERTS
Hi-Q SIX

### *Associate Manufacturers*

| | | |
|---|---|---|
| Carter Radio Co. | Benjamin Elec. Mfg. Co. | International Resistance Co. (Durham Resistors) |
| Sangamo Elec. Co. | Acme Wire Co. (Parvolt) | Radiall Co. (Amperite) |
| Samson Elec. Co. | | |
| Yaxley Mfg. Co. | | |



Automatic Variable Coupling—a wonderful new feature through which same control operates tuning condenser and primary coil simultaneously. This gives maximum and equal amplification over entire tuning range.

*The New*

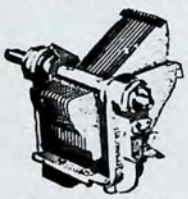
# HAMMARLUND-ROBERTS

## "Hi-Q" RECEIVER

### Embodies the Latest Hammarlund Developments

The coils and variable condensers specified by the ten nationally-known designer-engineers of the remarkable Hammarlund-Roberts "Hi-Q" Receiver are typical of Hammarlund advanced design and precision manufacturing methods.

These instruments are of standard design and may be used with assurance of satisfaction in any other circuit of similar characteristics.



*The "MIDLINE" Condenser*

Gives better separation of wave lengths than previous types. Has a full-floating rotor with removable shaft, adaptable to any scheme of single control, multiple condenser operation.

*"HAMMARLUND, JR."*

A high ratio, shielded midget condenser for use wherever small variable capacities and fine tuning are required. Base-board or one-hole panel mounting. Knob included.

*Some Other New Circuits in Which Hammarlund Products are Officially Specified*

COCKADAY "LC27"
SARGENT "INFRADYNE"
LACAULT "LR4"
HENRY-LYFORD
ST. JAMES SUPER
VICTOREEN SUPER
MORRISON "VARION"
HARKNESS "KH-27"
CARBORUNDUM SUPER
PACENT "ULTIMAX"
BROWNING-DRAKE
POPULAR SCIENCE MONTHLY "POWERFUL"
LOFTIN & WHITE
HAYNES "DX-2 MULTI-VALVE"

*We shall be glad to refer to the proper authorities any inquiries regarding the above receivers.*

*The "AUTO-COUPLE"*

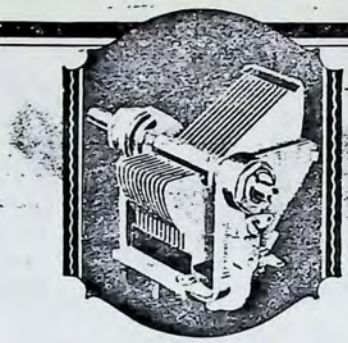
A scientifically correct tuned radio frequency assembly of Space-Wound Coil, "Midline" Condenser and Aluminum Shield, providing automatic graduated primary coupling at every condenser setting.

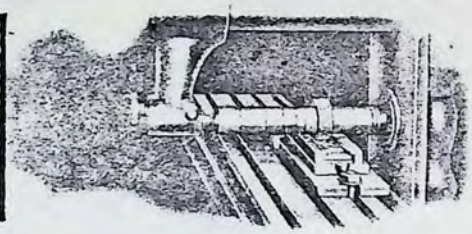
*EQUALIZER*

A compact, efficient variable condenser of small capacity, for neutralizing or balancing radio frequency circuits against undesirable oscillations on the low wave-lengths.

HAMMARLUND MANUFACTURING CO.
424-438 W. 33d Street, New York

For Better Radio
Hammarlund
PRECISION
PRODUCTS





*The above machine, designed and built by Hammarlund, cuts the slots in which Hammarlund Condenser plates are firmly soldered. One operation cuts all slots, assuring uniform spacing as the first step toward accurate capacity values.*

**HAMMARLUND**
***"Midline"***
**CONDENSER**

Soldered brass plates with tie-bars; warpless aluminum alloy frame; ball bearings; bronze clock-spring pig-tail; full-floating, removable rotor shaft permits direct tandem coupling to other condensers. Made in all standard capacities.

## Laurence Cockaday's "LC-28" RECEIVER, *The* VICTOREEN *and The New* HAMMARLUND -ROBERTS Hi-Q Six

**are among the score or more new receivers using HAMMARLUND PRECISION PRODUCTS**

WHENEVER quality results are required in a radio receiver, you may expect to find one or more Hammarlund Precision Products officially specified.

Hammarlund leadership has been attained, not through forced sales efforts, special deals, cut prices or any other of the so-called "tricks of the trade."

Just two things are responsible for the world-wide Hammarlund reputation and they are:—determination to make the best and unmatched facilities for accomplishment.

Public recognition is the natural result.

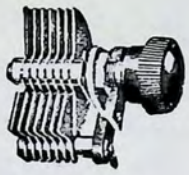
*Write for Folder*
**HAMMARLUND MFG. CO.**
**424-438 W. 33rd St., New York**

For Better Radio
**Hammarlund**
PRECISION
**PRODUCTS**

***Illuminated***
**DRUM DIAL**

Beautifully designed and substantially built. Gives distinction to any receiver and greatly simplifies tuning. Two finger control. Illuminated from back of panel.

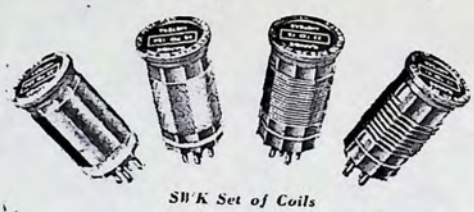
**HAMMARLUND**
**Star Midget Condensers**



*Star Midget*

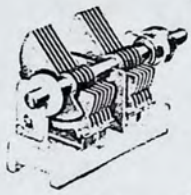
***New* HAMMARLUND Low Loss Coil Forms and Short Wave Plug-in-Coils**

*Type SW F*



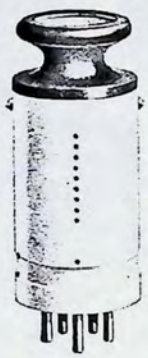
*SW K Set of Coils*

**HAMMARLUND**
**Split Stator Midget Condensers**



*Dual Midget*

**HAMMARLUND**
**Isolantite Coil Forms and Sockets**



*Type CF*

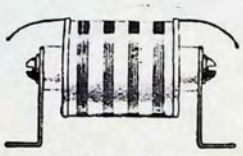
***Improved* HAMMARLUND**
**Midget Condensers**

*Type MC*

*Double Spaced*

**HAMMARLUND Standard and Midget Isolantite R. F. Chokes**

*Type CHX*



*Type CH-8*

For Better Radio
**Hammarlund**
PRECISION
**PRODUCTS**

**Manufactured by HAMMARLUND MANUFACTURING CO., Inc., 424-438 West 33rd Street, New York**

"Years Ahead," Said the Experts.

NOW, EVEN

**BETTER!**

RECENT tube developments have made the COMET "All-Wave" *(pictured above)* and COMET "Pro" *(below)* Superheterodynes—

even more selective, more sensitive, more stable and easier to tune.

Both receivers now use four "58" tubes, two "57's", one "247" and an "80" rectifier.

The "All-Wave" covers the short-wave and regular broadcast bands, 15 to 550 meters. Console or table model.

The "Pro" globe-trots on the short-waves only—and for proof of *unmatched efficiency*, here are

**SOME USERS**

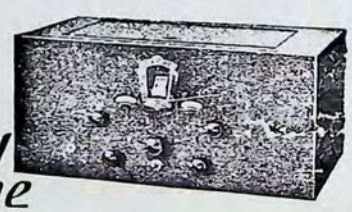
American Airways
Eastern Air Transport Co.
Northwest Airways
American Radio News Service
Canadian Government Signal Service
United States Government, Army and Navy Service
Key Stations of leading broadcasting networks, for foreign reception—
*and many more of convincing importance.*

The "Pro" may now be had in new style metal or wood cabinet. Battery Model also.

Really GREAT receivers—backed by the 30-year-old Hammarlund reputation for doing things *right.*

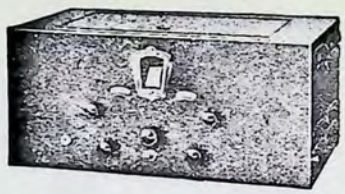
SEPTEMBER, 1933

Mail Coupon for Folder



*The* COMET

*Custom-Built* "PRO"



# COMET "PRO"

*Professional*

## Short-Wave Receiver

*The Lowest-Priced*

*COMPLETE*

*Short-Wave*

*Superheterodyne*

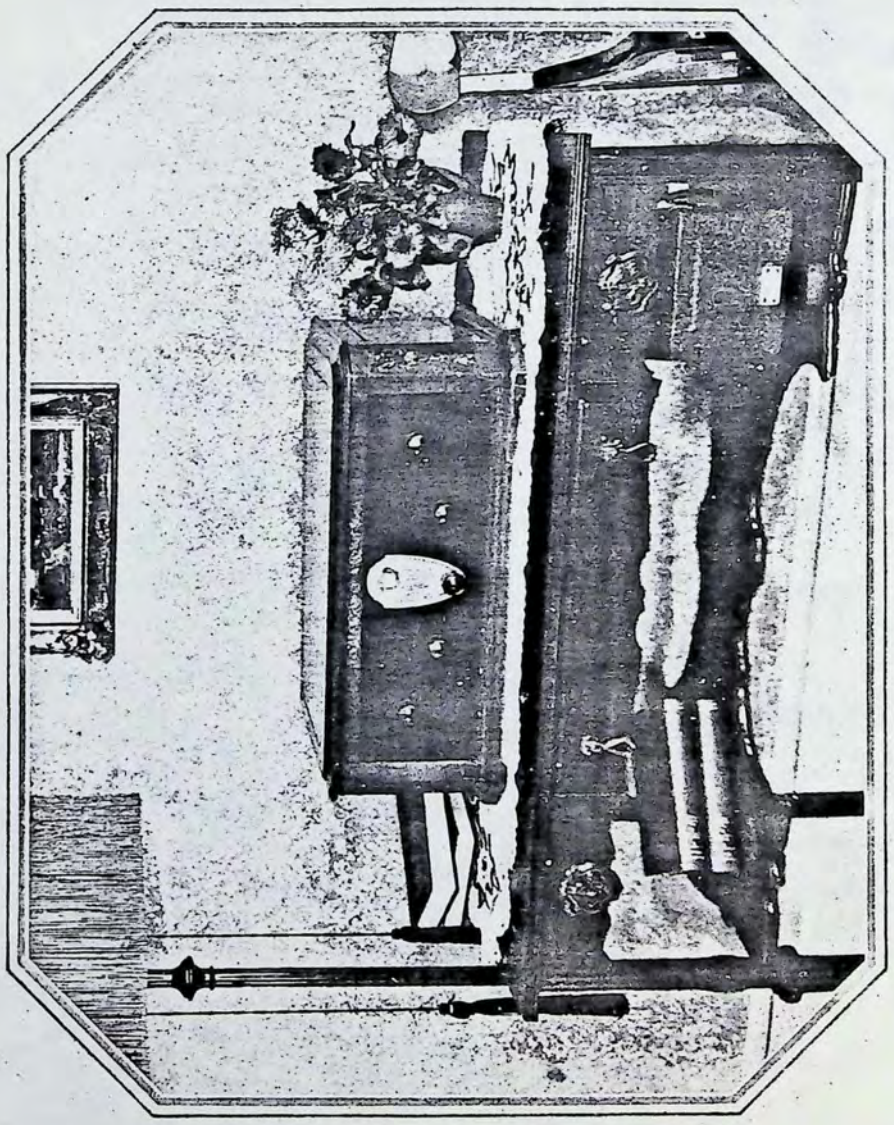
JANUARY, 1933

TO own a short-wave receiver comparable with the COMET "PRO", you must buy or build a perfect tuner, an adequate power supply, a complete set of coils, special transformers, etc. These will make your receiver cost more than if you bought the "PRO" complete, with all "accessories" built-in and scientifically matched to the receiver.

The list price of the COMET "PRO" is $150 (less tubes). But it won't cost you that much! As a recognized amateur you are entitled to a discount of 40 and 2 per cent, which reduces the price to $88.20, plus a small Federal Excise Tax. That price includes not only a tuner, world-famous for its sensitivity and selectivity, but also a built-in power pack, air-tuned transformers, and all coils needed to cover a range of 15 to 250 meters, with band-spread tuning at all frequencies.

Think it over and you'll buy the COMET "PRO" for its unexcelled performance, plus its unequalled value and economy.

For Better Radio
Hammarlund
PRECISION
PRODUCTS



The NATIONAL SHIELD-GRID FIVE

Like HAMMARLUND, NATIONAL began establishing their reputation in the marketplace with a single manufactured item - a variable condenser. The terms "DX" and "Low Loss" were coming into vogue, and both expressions were used in NATIONAL's adverts. However, in 1923, in keeping with the then-current rage for regenerative receivers, NATIONAL did offer via media a few circuits, but did not produce sets.

While most hobbyists readily associate the name James Millen with NATIONAL, it was actually W.A.Ready who, on becoming president for the Cambridge-based company, re-oriented the company's efforts towards what was to become their hall-mark - exceptional short-wave receivers - with the well-known "Thrill Boxes" their most popular set. The validity of their reputation is attested to even today by old time hams still in love with the HRO series of SW receivers.

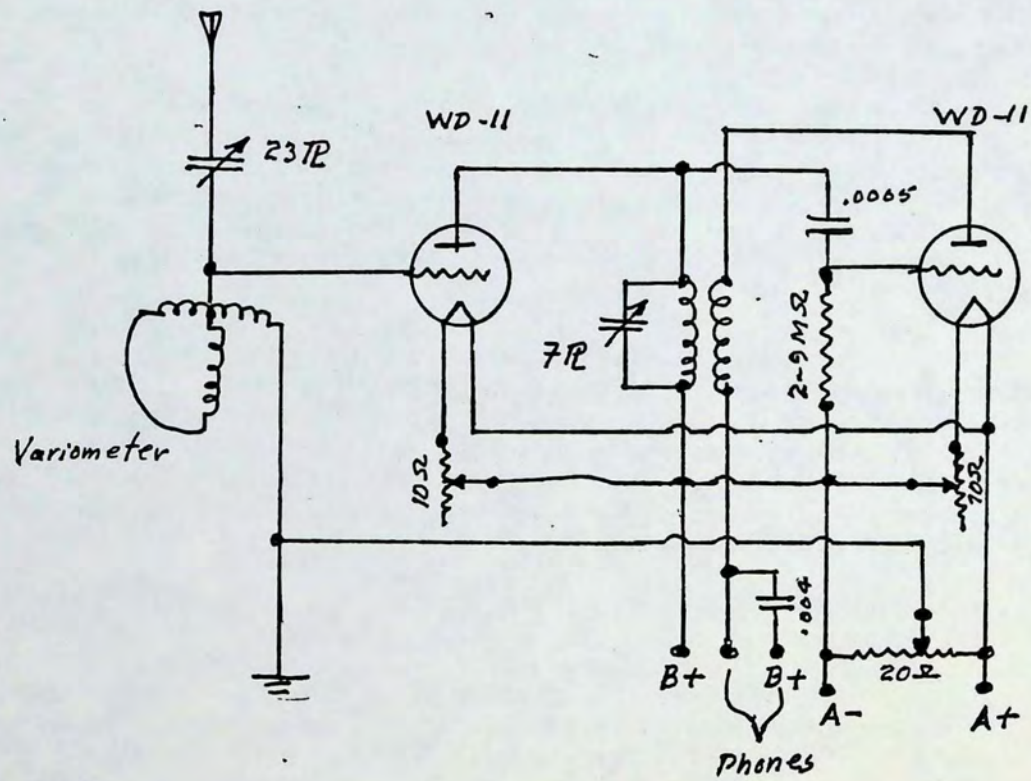
Again like HAMMARLUND, NATIONAL moved from a single item into the design and production of RF coils, impedaformers, power transformer configurations, power supplies, coupling coils, coil forms, etc. Probably the most famous of their excellent coils were those that became the standard BROWNING-DRAKE coils. At one point, after Millen had added his talents to NATIONAL, he joined Glen Browning in designing a BC receiver that will be found detailed herein.

Where HAMMARLUND went on to design BC receivers of high merit that became known as the "Hi-Q" series, NATIONAL concentrated on short-wave receivers. The HRO series is a linear descendent from the "Thrill Box" series of the late Twenties, of which there were five variants. In the following pages you will find the evolution of the series. Because data anent the latter-day NATIONAL receivers are readily available they are not detailed here.

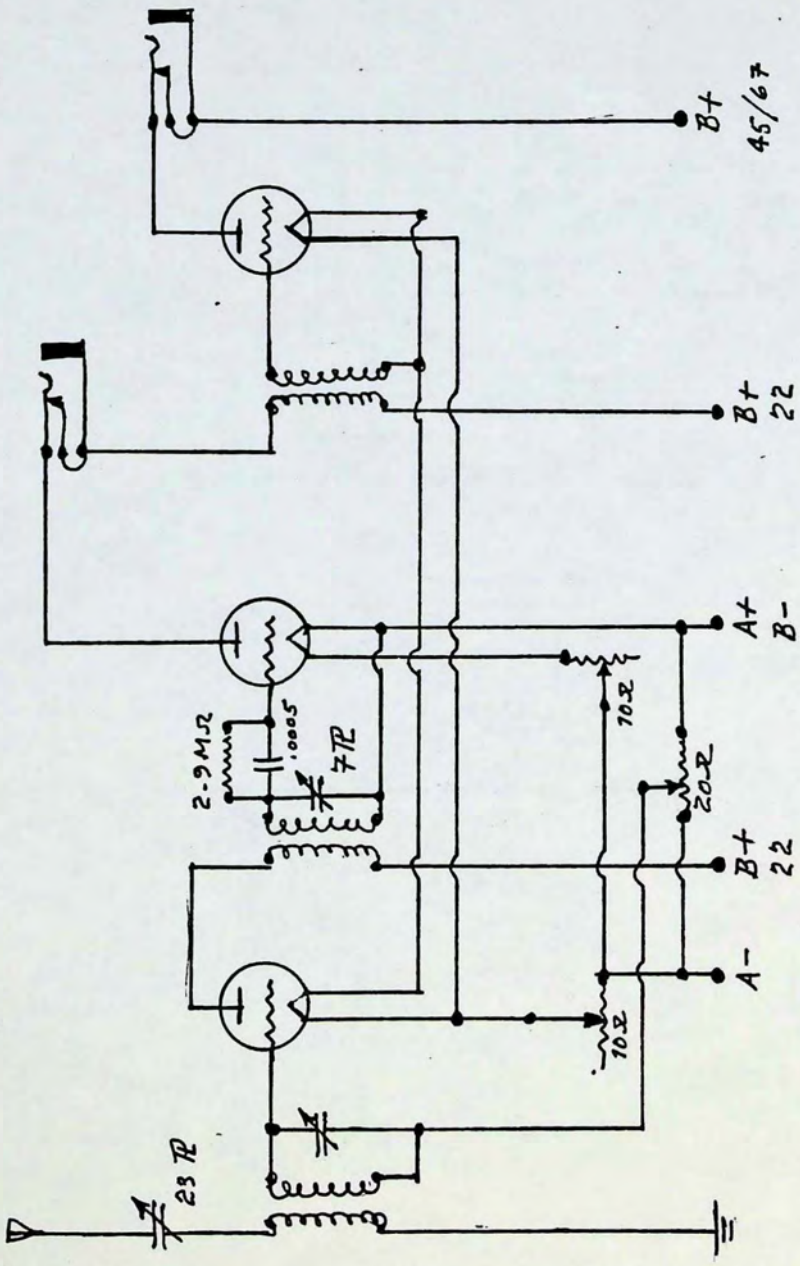
The SW manuals published by NATIONAL at the beginning of the Thirties were much more elabourate and better packaged than those which were put out by HAMMARLUND, but like the HAMMARLUND manuals, NATIONAL's manuals were mostly given over to depictations of circuits by others in which NATIONAL components were specified. The major difference was that in the NATIONAL manuals, articles were included by the then-leading men in the field, such as Bouck, Marshall, Hatry, Kruse, Hurd, Millen.

## NATIONAL SINGLE AND DUAL CIRCUIT REGENERATIVES

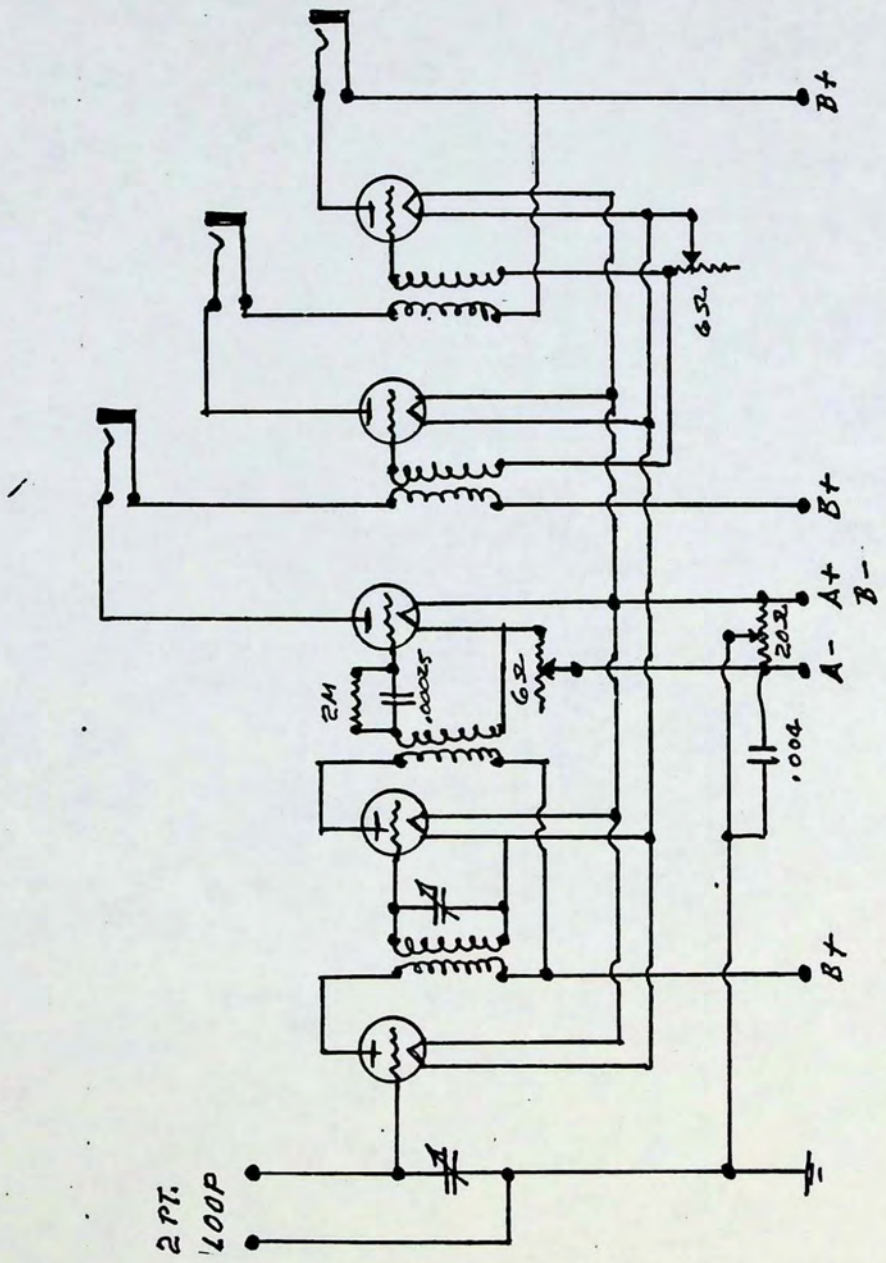
The following sketches of three National regeneratives represent National's first go at getting into the home-construction of radios. They were neither better nor worse than similar circuits being offered the home-constructor via radio media. There was a lull, apparently, between these early efforts and the early National radios we normally associate with the name. All of the circuits shown were offered in 1923.



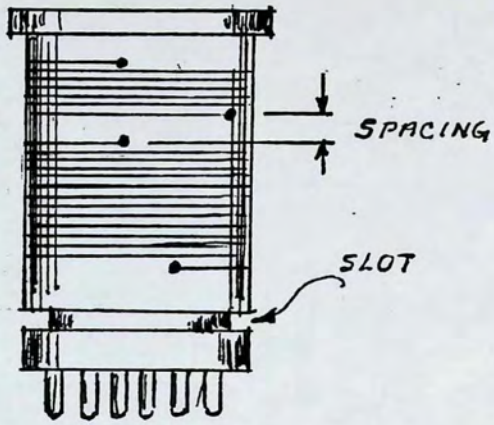
NATIONAL SINGLE & DUAL-CIRCUIT REGENERATIVES, 1923:Sht. 2



NATIONAL DOUBLE CIRCUIT REGENERATIVE, 1923



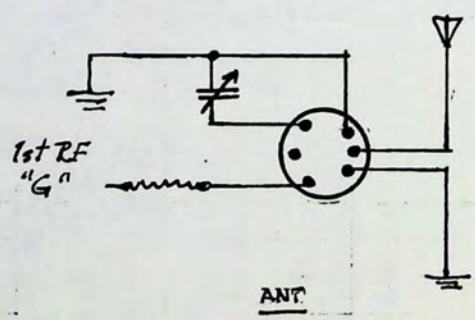
## EARLY NATIONAL PLUG-IN COILS

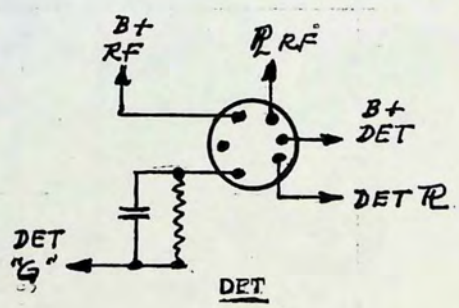



| RANGE: | PRI | SEC | SPACE | SLOT | NO. |
|---|---|---|---|---|---|
| 9 - 15 Meters | - | - | - | - | 60 |
| 13.5 - 25 " | 5.75T | 6¼T | 7/32" | 2T,#26 | 61 |
| 23 - 41 " | 9.75T | 11.75T | 5/32" | " | 62 |
| 40 - 70 " | 12.75T | 13.75T | 3/32" | " | 63 |
| 65 - 115 " | 21T | 34.75T | 1/16" | 3T,#26 | 64 |
| 115 - 220 " | 38T | 63.75T | 1/32" | 5T,#26 | 65 |

COIL NO. WIRE SIZE:

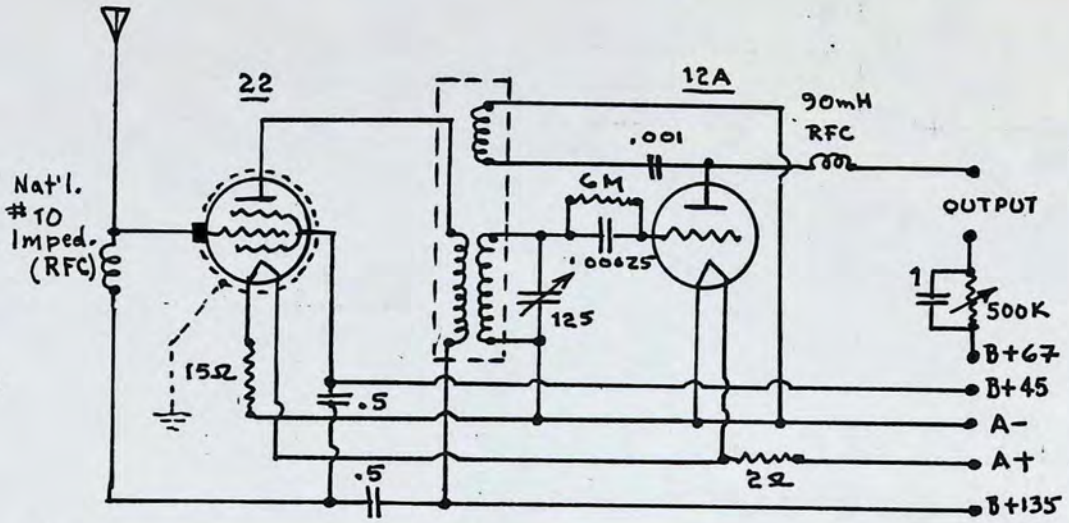
| | | | |
|---|---|---|---|
| 61 | PRI = #24 | SEC = #14 | All wire SSC. |
| 62 | " = #24 | " = #18 | |
| 63 | " = #26 | " = #18 | |
| 64 | " = #26 | " = #24 | |
| 65 | PRI = #26 | SEC = #24 | |




NOTE: The 3 prongs along RH arc are close together.

## NATIONAL SCREEN-GRID SW RCVR., 1928

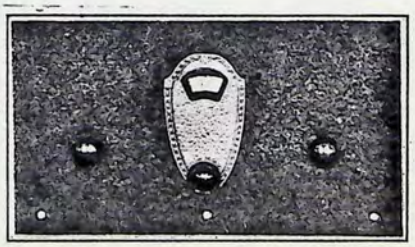



(Designed By James Millen.)

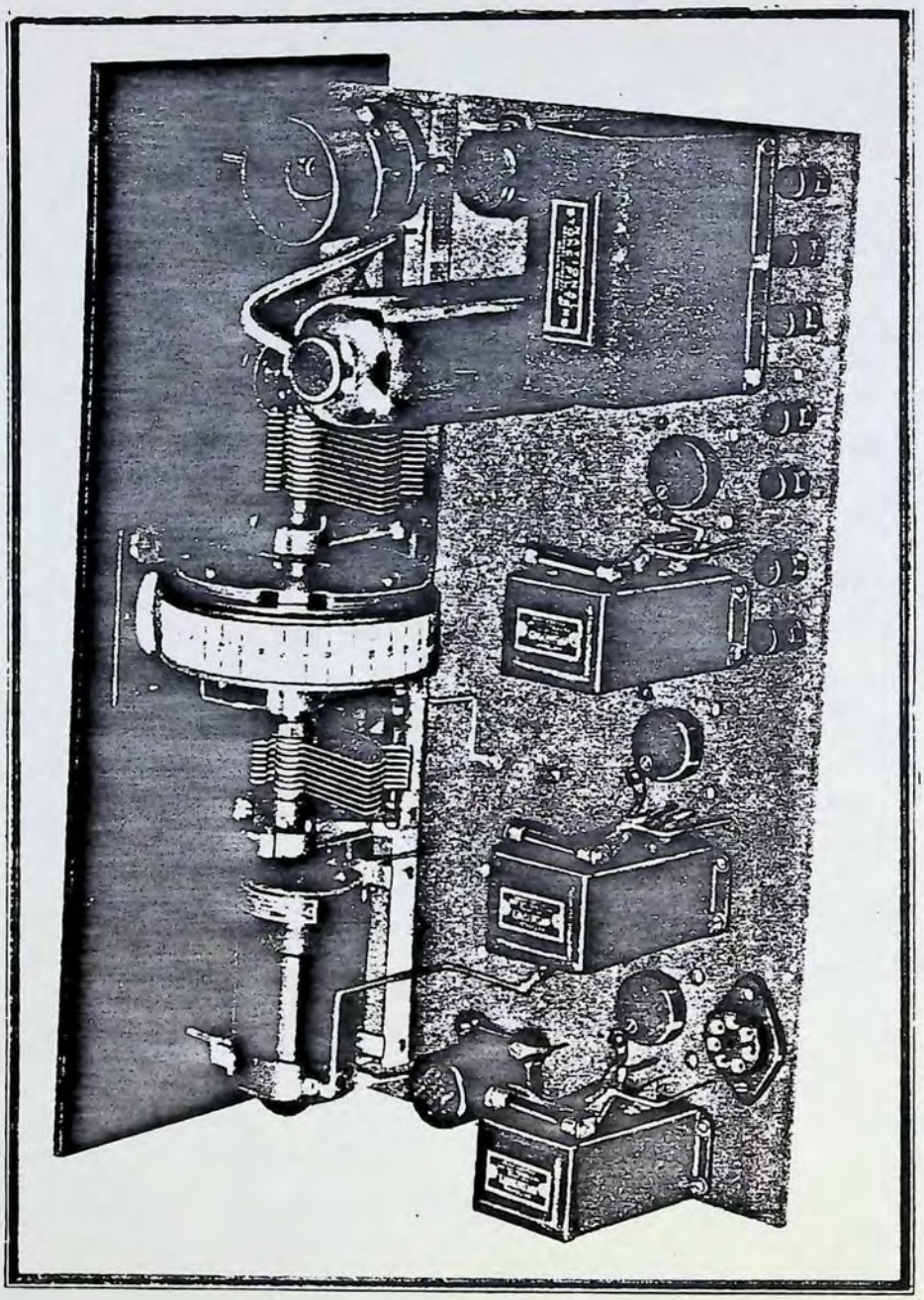
NOTES:

1. #9 copper buss-bar used for grounding, rather than the frame.
2. National vernier dial with integral pilot light.
3. 6-Contact coil socket .

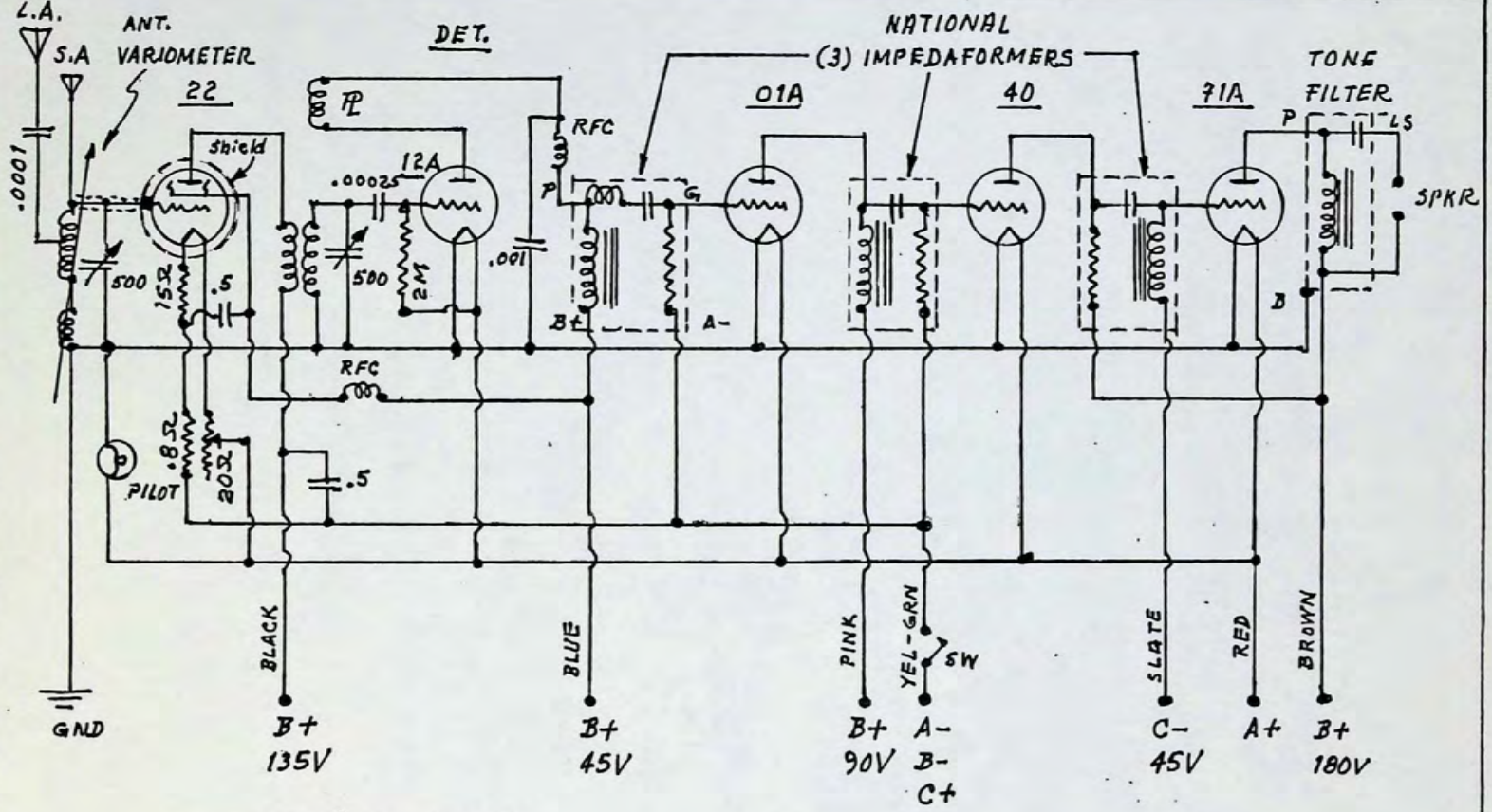
Panel = 7" x 12" x .125" (metal).



## NOTES



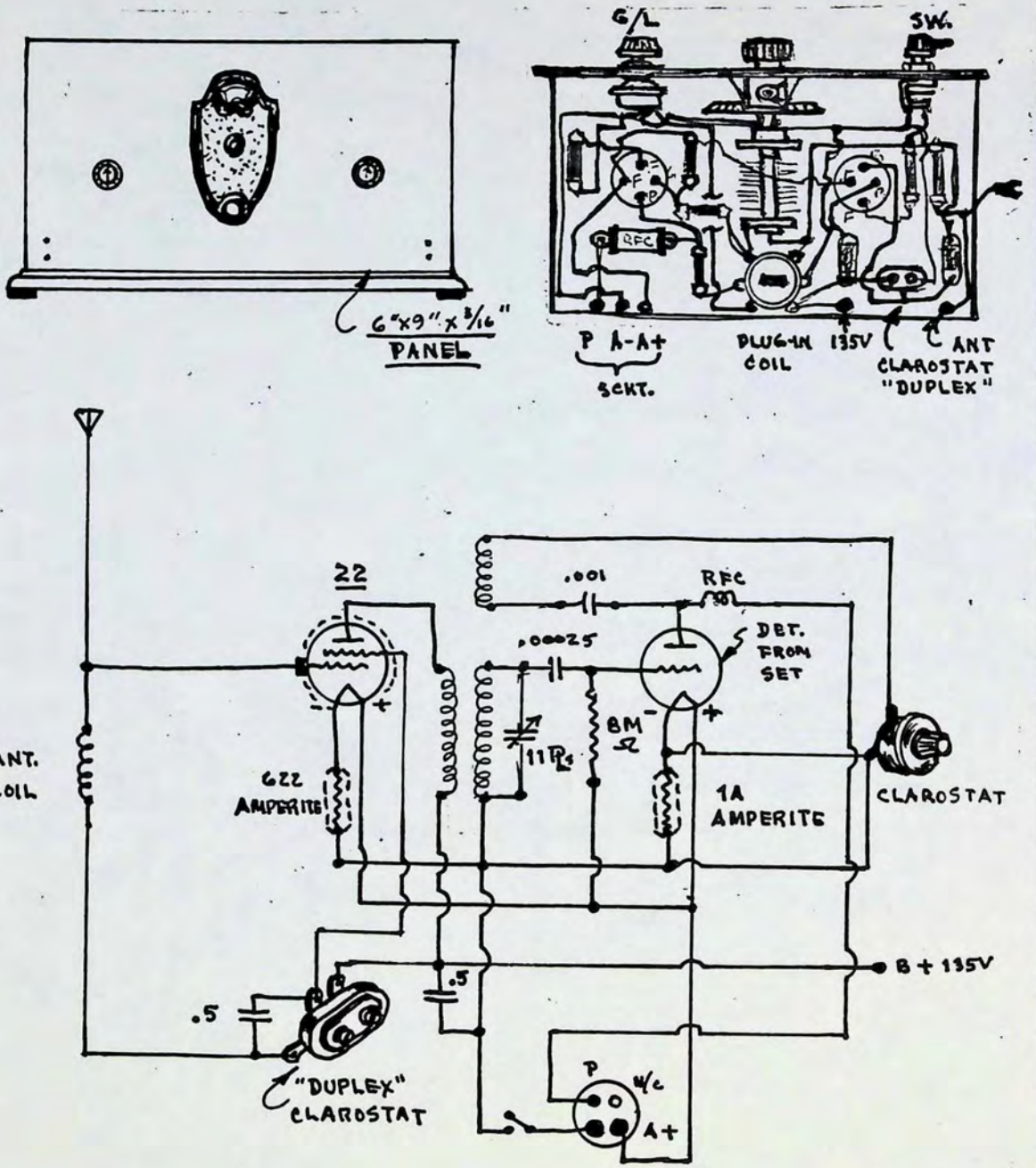
National Screen Grid Five




Ground 22 tube shield.
ANT COIL = 9T, #27 DSC PRI.
(2"ø) 60T, #28 Enam, SEC.
REGEN. CPLR. = 108T, #28 Enam., SEC.
(CB 9-28) 22T, #27 DSC on Small Rotor @ high end of xfrmr.
22T, #34 DSC, slot-wound @ low potential end of coil.
ANT VARIOMETER = 12T inside ANT coil, w/ Stator winding of #28 enamelled wire spaced @ one-half the diameter.

## NATIONAL SCREEN-GRID FIVE

NATIONAL SHORT-WAVE CONVERTER, 1929

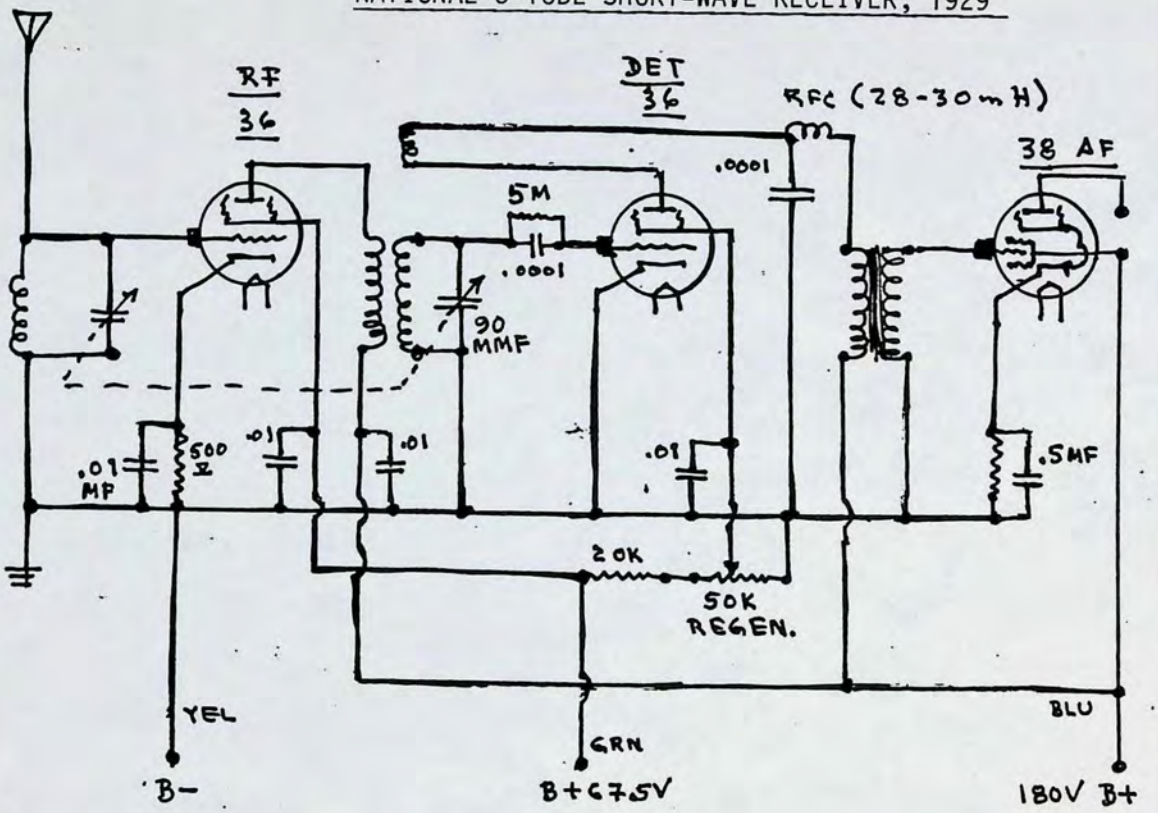



Negative (-) leg to metal chassis.

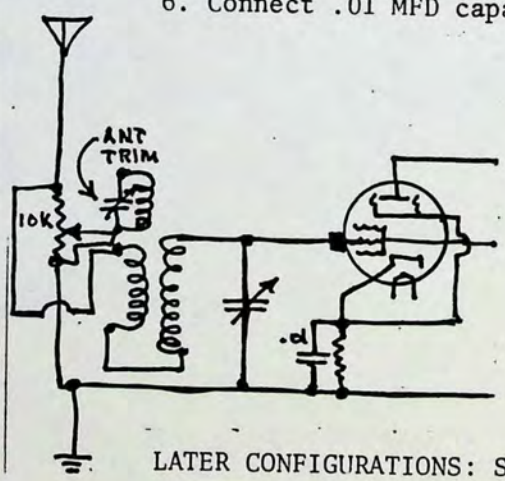
4-Prong Plug to DET socket.

## NOTES

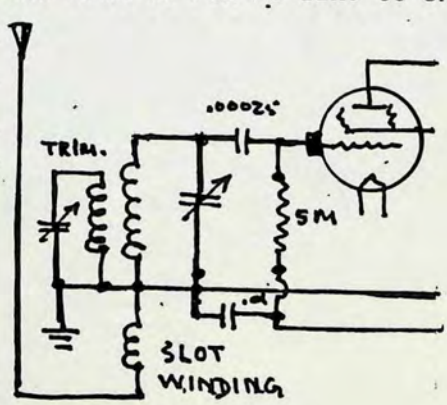
## NATIONAL 3-TUBE SHORT-WAVE RECEIVER, 1929




NOTES:
1. Coil sockets should be 1" above chassis & .75" from walls.
2. Tickler coil wound in bottom slot of coil form.
3. PRI winding wound inbetweeen SEC windings.
4. Coil forms = 1½" Ø. RFC = 350T #36 SCE, ½" Ø dowel(CRITICAL!).
5. ANT is coupled to GND through RFC. (ANT condenser-coupling causes mis-tuning and 'hash'.)
6. Connect .01 MFD capacitor to one side of FIL AC line to GND.

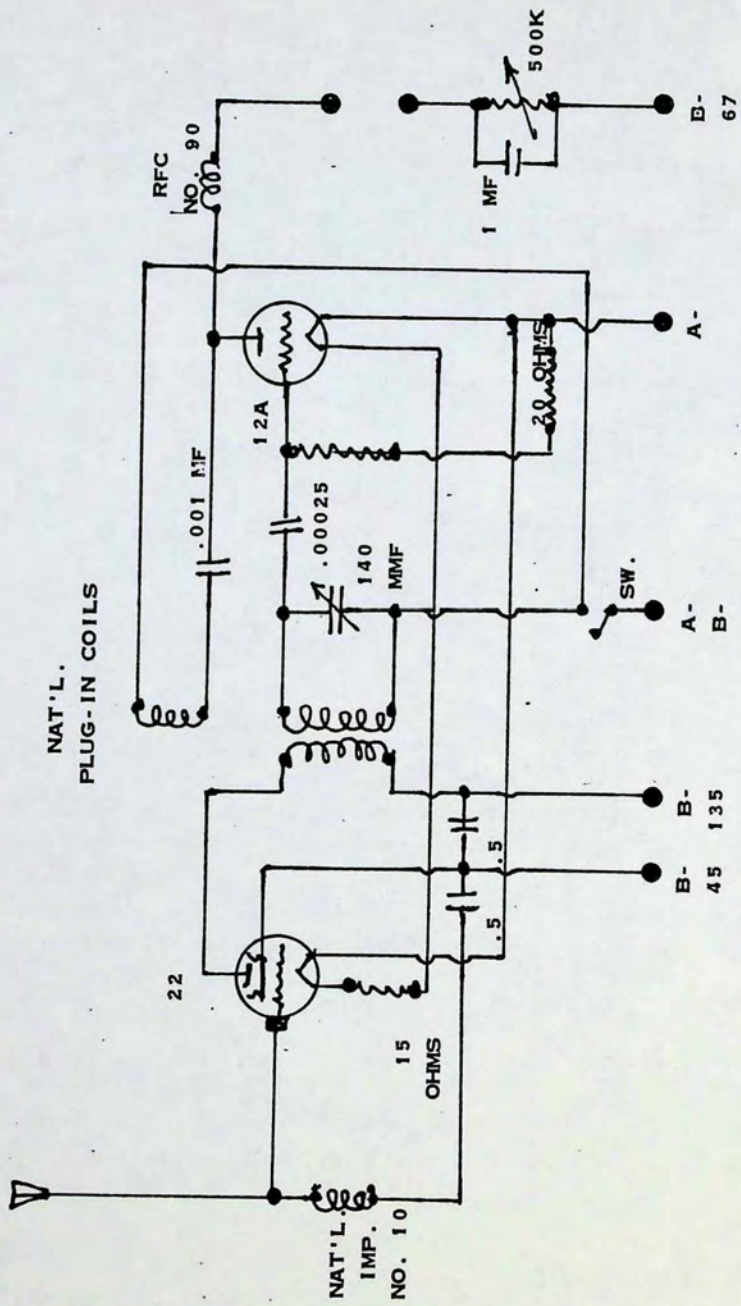



LATER CONFIGURATIONS: SW-5

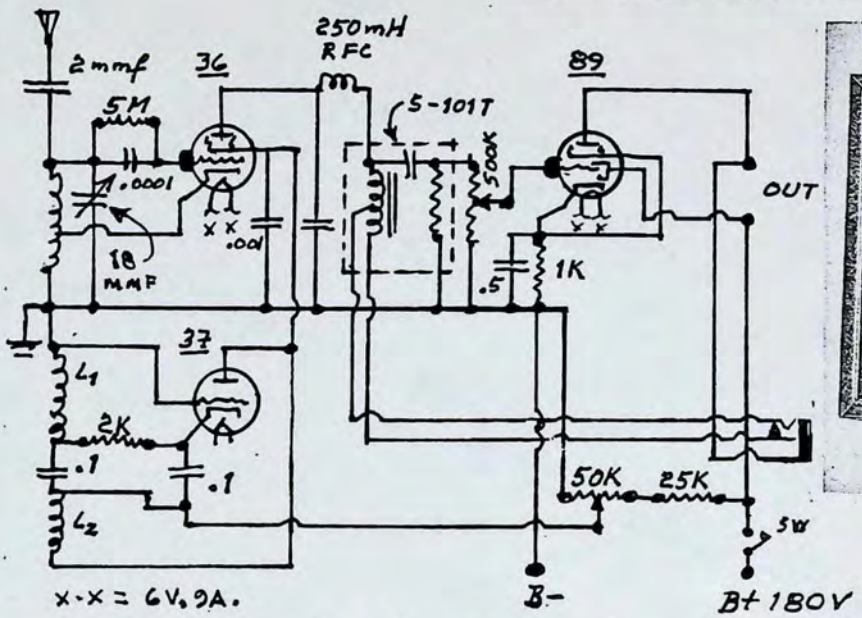


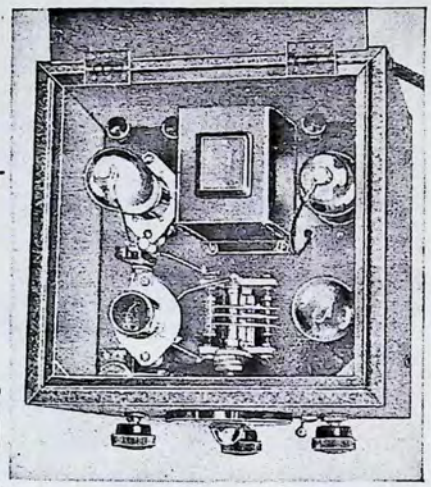

SW-58

NATIONAL S.G. SHORT-WAVE TUNER, 1930



## NATIONAL-5 METER RECEIVER, 1931



### CAUTION

When tube heaters are lighted and B+ is applied, headphones or a speaker MUST be plugged-in; otherwise, the 89 will blow!

L1 = 900 Turns, #38 SSC Wire )
L2 = 1,200 Turns, #38 SSC Wire) Universal wound on ½" Ø core.

Output Impedance = 7-ohms. Speaker impedance whould be between 3K and 15K-ohms.

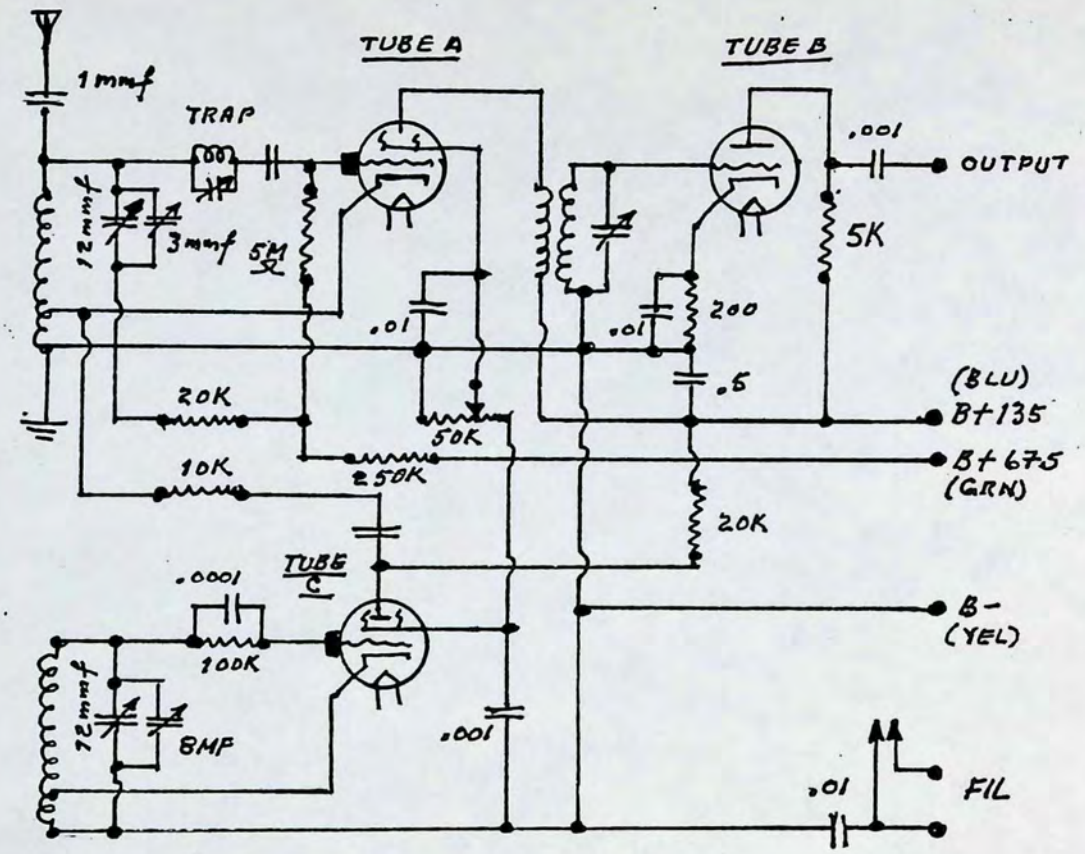
COIL DATA:

| BAND | TUNED CIRCUIT | CATHODE TAP | COIL DIA. | WIRE | LENGTH |
|---|---|---|---|---|---|
| 5 | 2½ T | ½ T | 1" Ø | #18 | ¼" |
| 10 | 5½ T | 2 T | 1" | 20 | ¼" |
| 20 | 12¾ T | 2¼ T | 1" | 20 | ½" |
| 40 | 27¾ T | 2¼ T | 1" | 24 | ¾" |
| 80 | 43 T | 2¼ T | 1½" | 24 | 1" |
| 160 | 96 T | 2¾ T | 1½" Ø | 30 | 1½" |

NOTE: Coils were available for 4 to 7.5 meters.

(OSWRM 173)

NATIONAL H.F.C. 5 METER CONVERTER, 1931



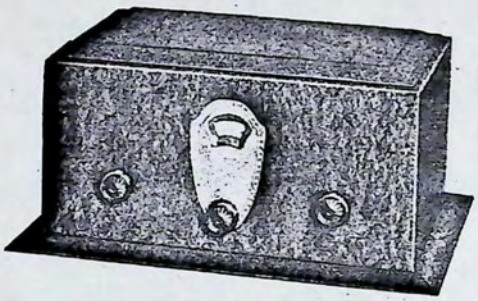

| TUBE | AC | DC |
|---|---|---|
| A | 24/35 | 36 |
| B | 27 | 37 |
| C | 24/35 | 36 |
| FIL.VOLT. | 2.5VAC | 6VDC |

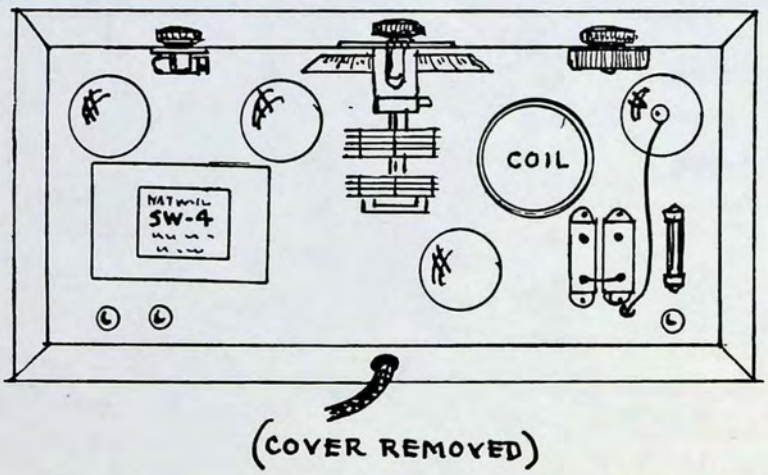
| 56-60 MC DATA | | | |
|---|---|---|---|
| Coil | Wire | Turns | Tapt |
| MOD. | #18 | 2 1/6 | 3/8 T |
| OSC. | 18 | 2 1/12 | 3/8 T |

(Wound on Std. 4-prong base.)

(OSWRM)

NATIONAL "THRILL BOX" SW. RCVR.; Sht. 1

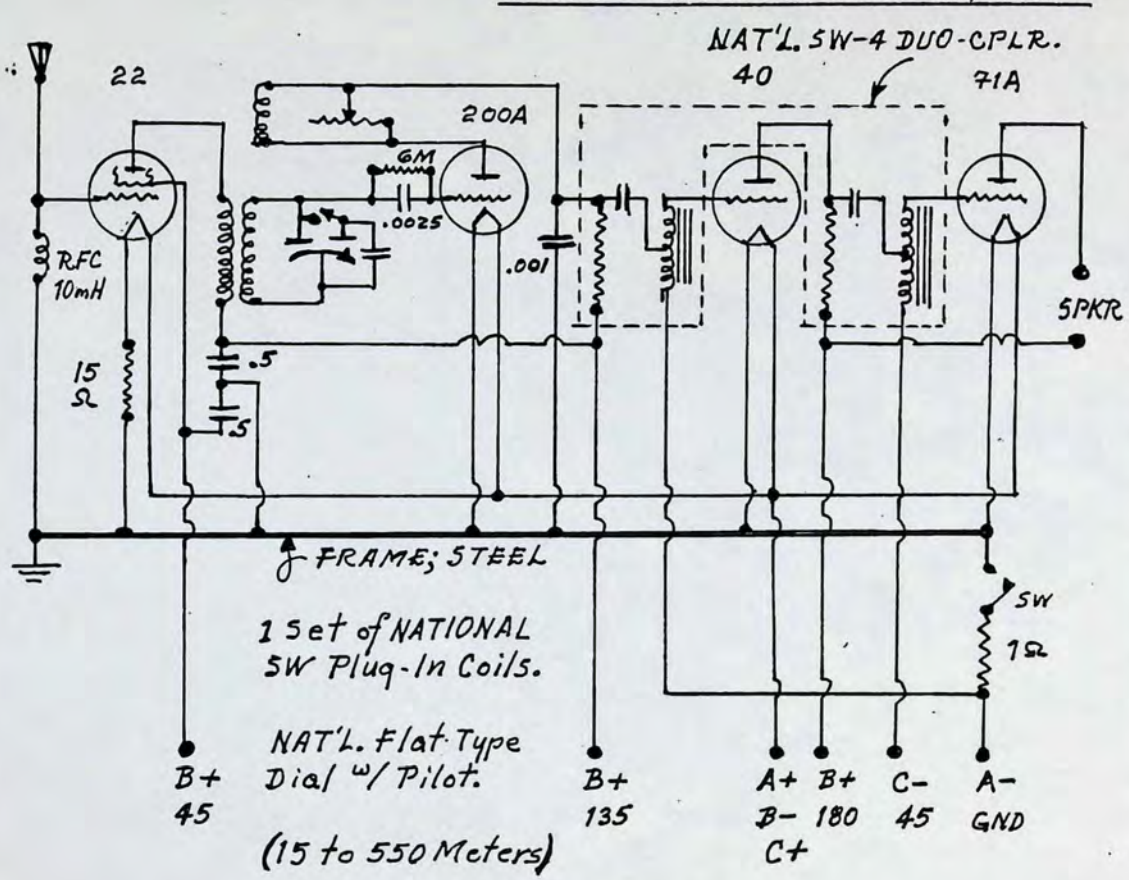


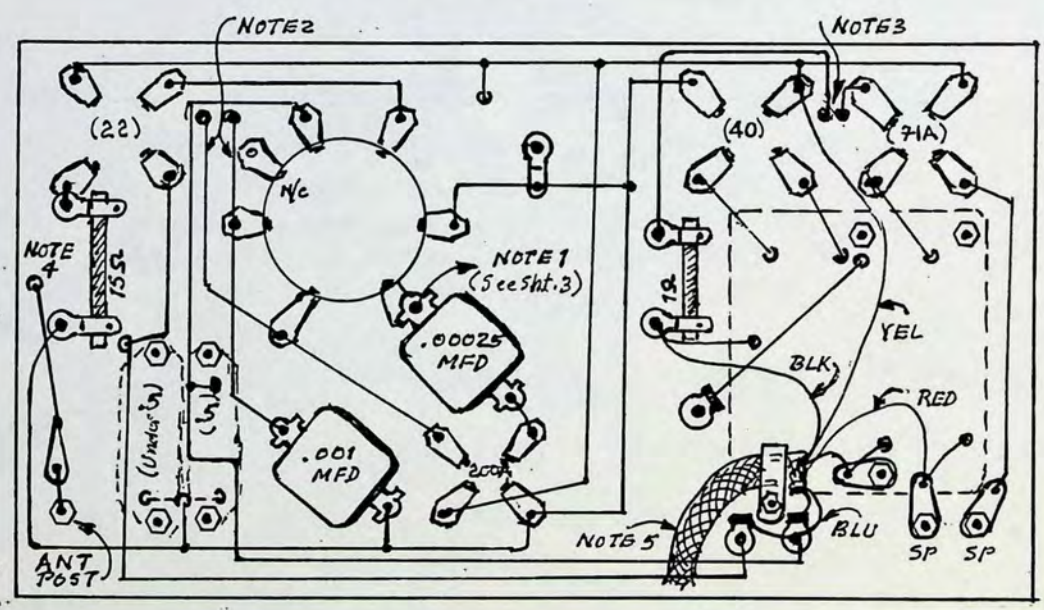



This was an extremely popular, extremely efficient short-wave receiver of 1929. It contained a few innovations which became standard among other set manufacturers. Unfortunately, the "Thrill Box" had unpredictable oscillations, and all "B" voltages were critical. Still, it was a neat unit.

(RW 7-6-29)

NATIONAL "THRILL BOX" SW RCVR., Sht. 2



NATIONAL "THRILL BOX" SW RCVR., Sht. 3

NOTES: (See Sht. 2)

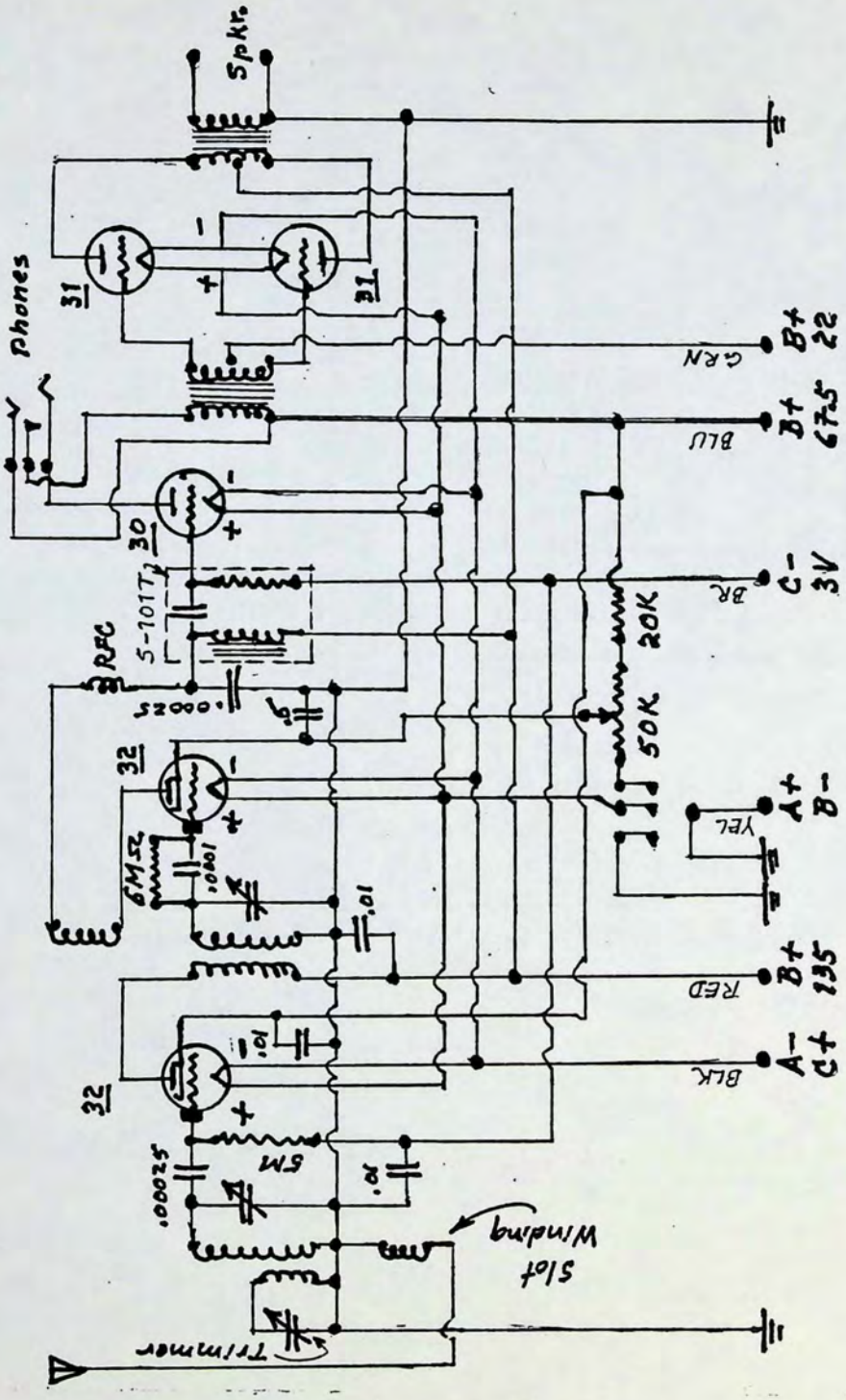
1. Connect lead to Stator of small sexion of Tuning Condenser. (Pierce sub-panel to do this.)
2. To 3KΩ resistor.
3. To FIL Switch.
4. To cap of S.G. Tube.
5. Cable Colour Code:
   A-, GND = Black
   A+, B-, C+ = Yellow
   C- = Green
   B+ 45 = Blue
   B+ 135 = Brown
   B+ 180 = Red
6. Voltages are critical, & batteries are recommed over a B-Eliminator. Screen & PL voltages are hyper-critical for greatest sensitivity.

EXCESS OSCILLATION:

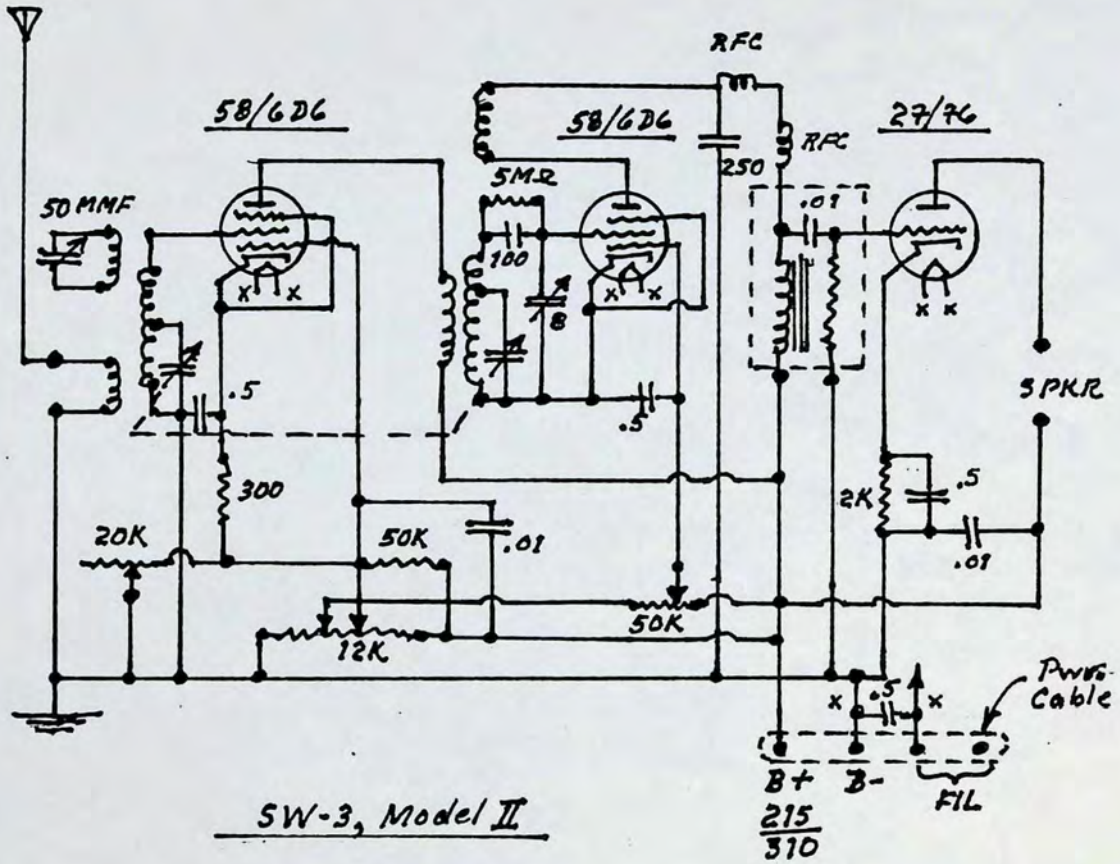
Voltage supply faulty, & can also cause motorboating. PL supply must be precise. Better filtering via larger capacity electrolytics will help. Try connecting a 6 MF condenser across the 135V tap.

USE of DYNAMIC SPEAKER requires a xfrmr. affixed to it; or any speaker may be used, provided a xfrmr. is used. A cone-type PM speaker may be used w/out a xfrmr.

NATIONAL Type SW-3 DC "Thrill Box"; Sht. 1

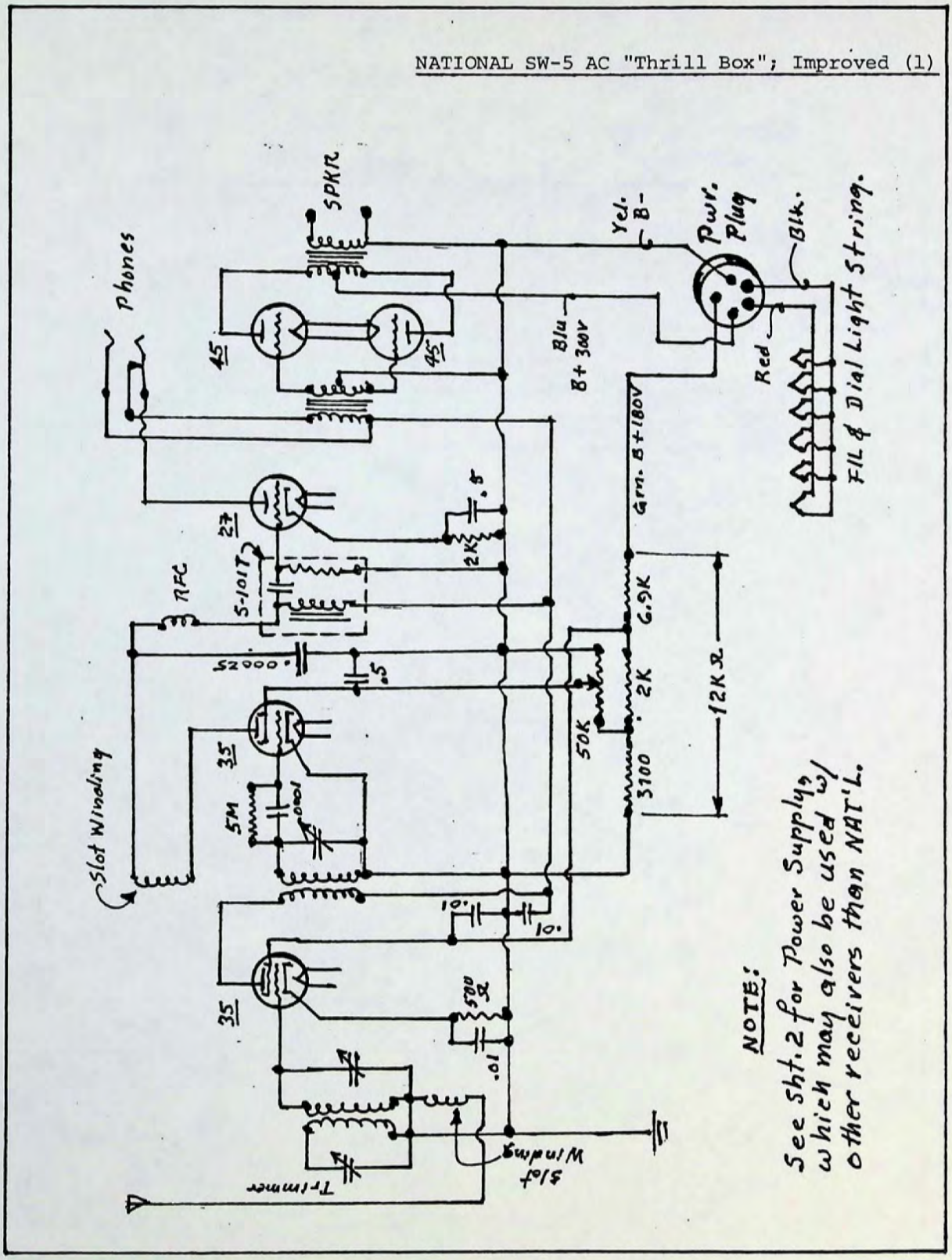


NATIONAL SW-3, Model II, "Thrill Box"; Sht3

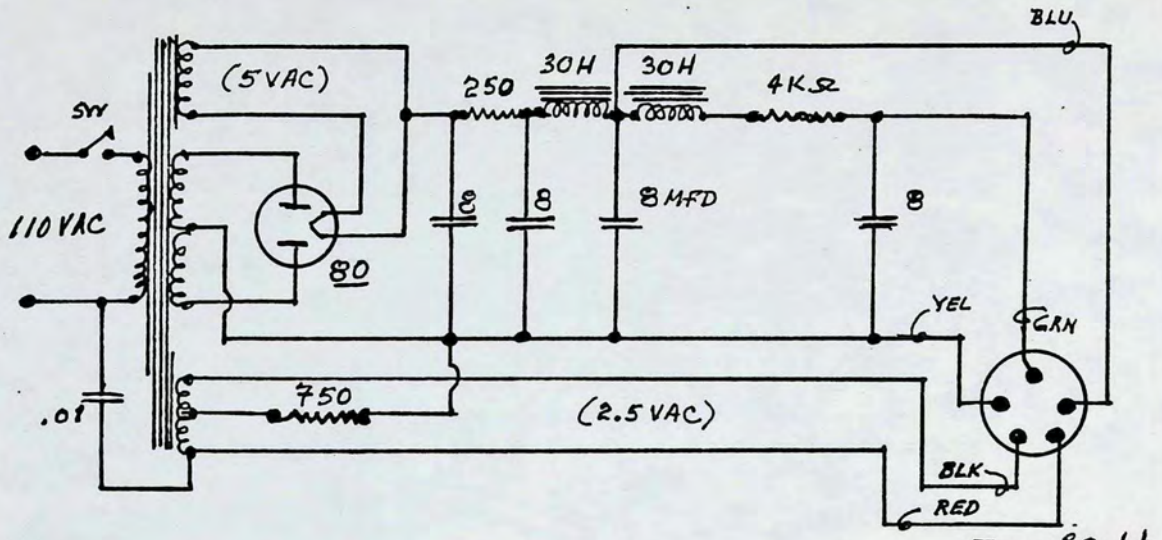



SW-3, Model II

| | | | | |
|---|---|---|---|---|
| MODEL I | Tube Complement: | (2) 35, 27. | Colour Coded coils. |
| Version II | " | " | : (2) 36, 37. | "10-20" Series. |
| Version III | " | " | : (2) 30, 32. | "10-20" Series |
| MODEL II | " | " | : (2) 58, 57; (2) 6C6, 76; (2) 6D6, 27. | "60" Series |
| MODEL III ("Universal") | Tube Complement: | | (2) 6J6, 6C5; (2) 1N5, 1A5. | "30-40" Series |


NATIONAL SW-5 AC "Thrill Box"; Improved (1)
SPKR
Phones
45
45
Yel. B-
Pwr. Plug
Blk.
Blu B+ 300V
Red
Grn. B+180V
FIL & Dial Light String.
27
S-101T
RFC
2K
.5
.002
.5
6.9K
2K
3100
50K
12K Ω
35
5M
100
Slot Winding
10.
10.
35
500 Ω
.01
Trimmer
Slot Windings
NOTE:
See Sht. 2 for Power Supply which may also be used w/ other receivers than NAT'L.

NATIONAL SW-5 AC "Thrill Box"; Improved (2)




## SW-5 POWER SUPPLY
(AC Model)

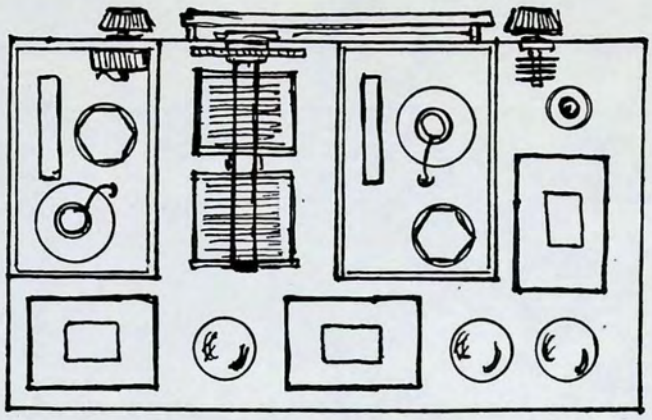
### NATIONAL "THRILL BOX" COIL DATA, AC & DC

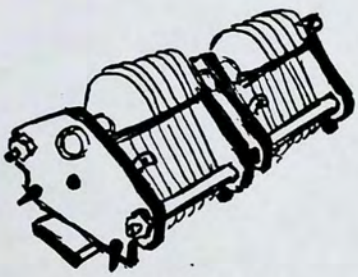
| | | |
|---|---|---|
| Brown | #10 | Range 9 to 15 Meters |
| Black | 11 | Range 14.5 to 25 " |
| Red | 12 | Range 23 to 41 " |
| White | 13 | Range 40 to 70 " |
| Green | 14 | Range 65 to 115 " |
| Blue | 15 | Range 115 to 200 " |
| Orange | 16 | Range 200 to 360 " |
| Yellow | 17 | Range 350 to 550 " |
| Purple | 18 | Range 500 to 850 Meters. |

BAND-SPREAD COILS

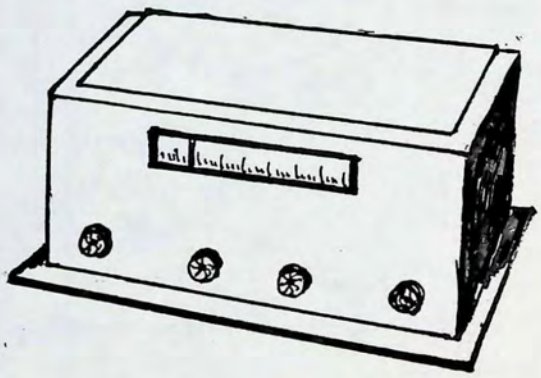
| | |
|---|---|
| #11A | 20 meters |
| 13A | 40 meters |
| 14A | 80 meters |

NATIONAL SW-45-A SW RECEIVER, 1932;Sht.1



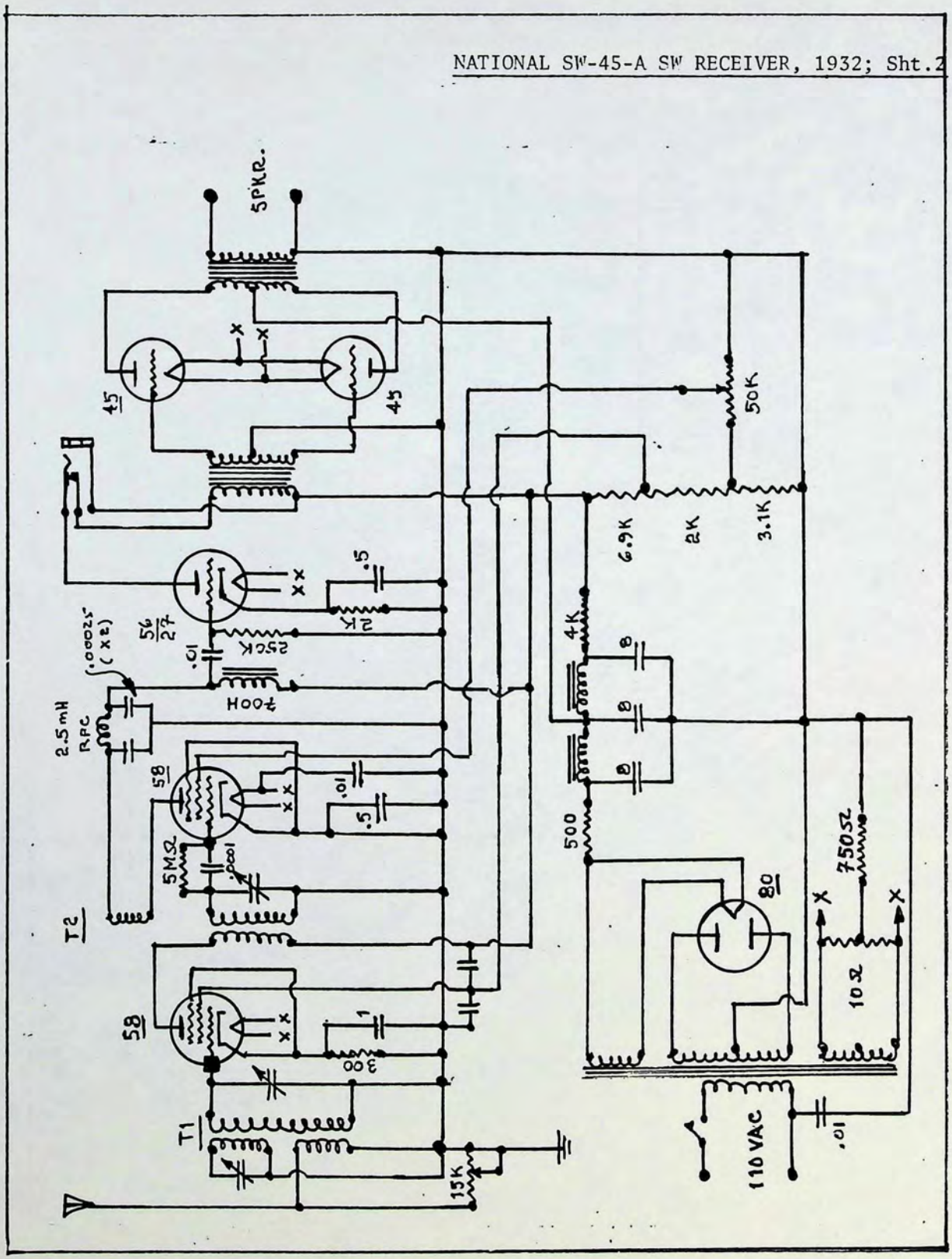


ROTORS INSULATED FROM
FRAME & FROM EACH OTHER.

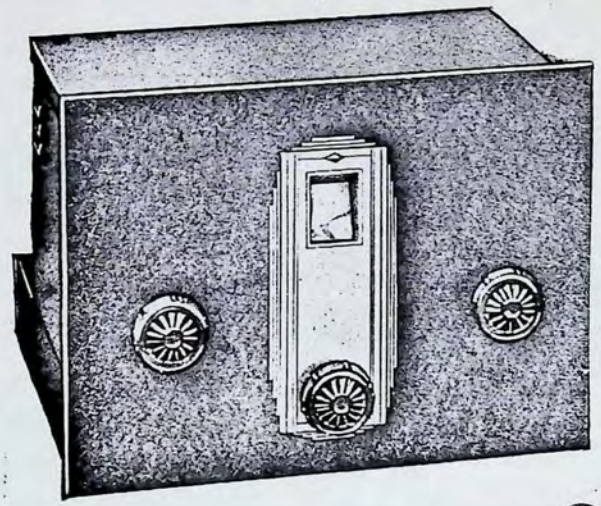


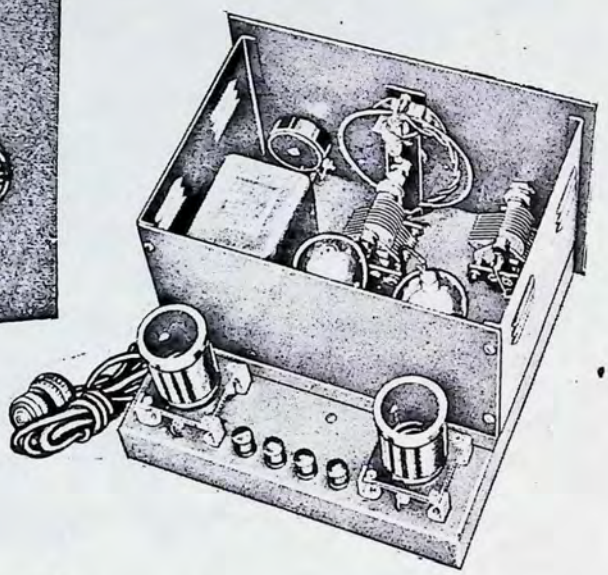
NOTE: This was essentially the SW-45, with Pentodes substituted in the RF and DET sexions, the addition of a gain control, and an RF filter.

NATIONAL SW-45-A SW RECEIVER, 1932; Sht.2

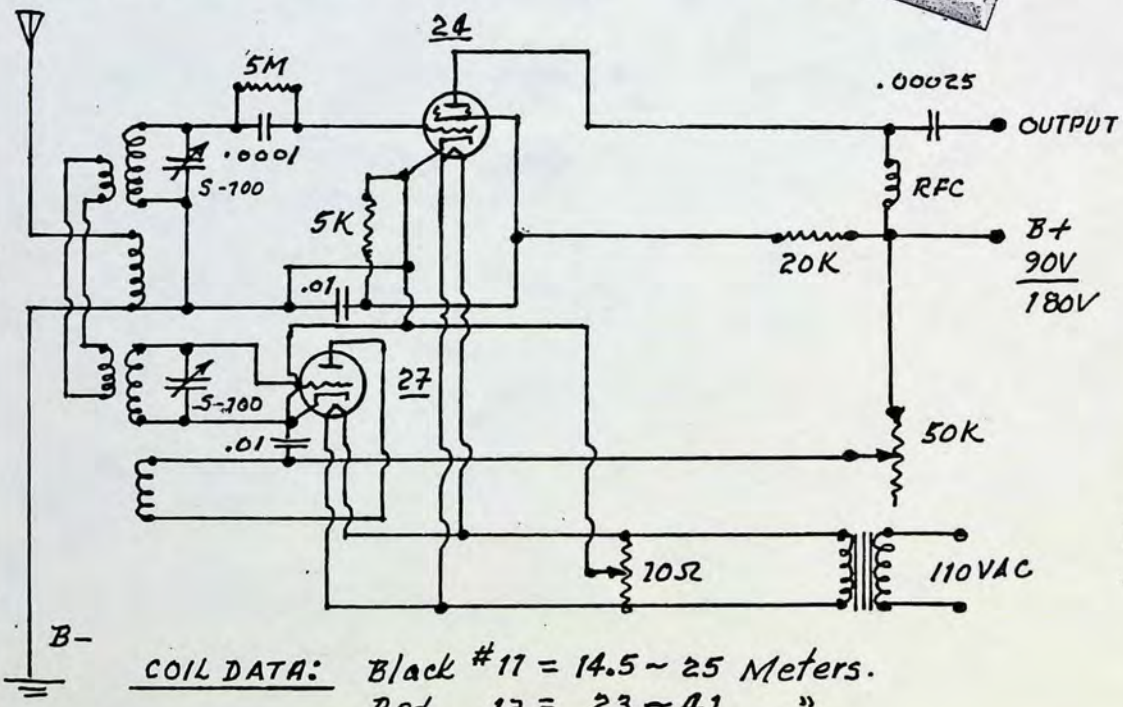


NATIONAL AC SW "Supersonic" ADAPTER, 1932

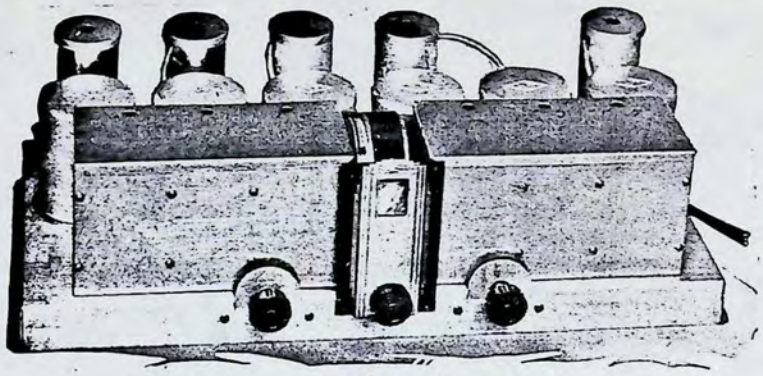




(Variables = 270° SLF TPs.)




COIL DATA: Black #11 = 14.5 ~ 25 Meters.
Red 12 = 23 ~ 41 "
White 13 = 40 ~ 70 "



The Aristocrat of Broadcast Tuners—the MB-30

The NATIONAL MB-30 was the top-of-the-line of the NATIONAL BC tuner designed by Millen and Browning. It was a tuner only, offered in two versions, assembled on a chassis only or in a conventional NATIONAL steel cabinet.

The first version was known as the MB-29 (MB standing for Millen-Browning), employing 24s and one 27 tube. A screen grid version was known as the MB-30, depicted above.

While other battery eliminators could be utilised, with an unpredictable result, the power supply designed by NATIONAL, known as the NATIONAL "Velvet A-B" unit, worked best.

The basic circuitry of the MB-29 and the MB-30 were essenially the same, with the MB-30 having an added stage of AF amplification before the tuner. Over-leaf you will find an epitomised circuit of the MB-29, which will give you ideas applicable to the MB-30.

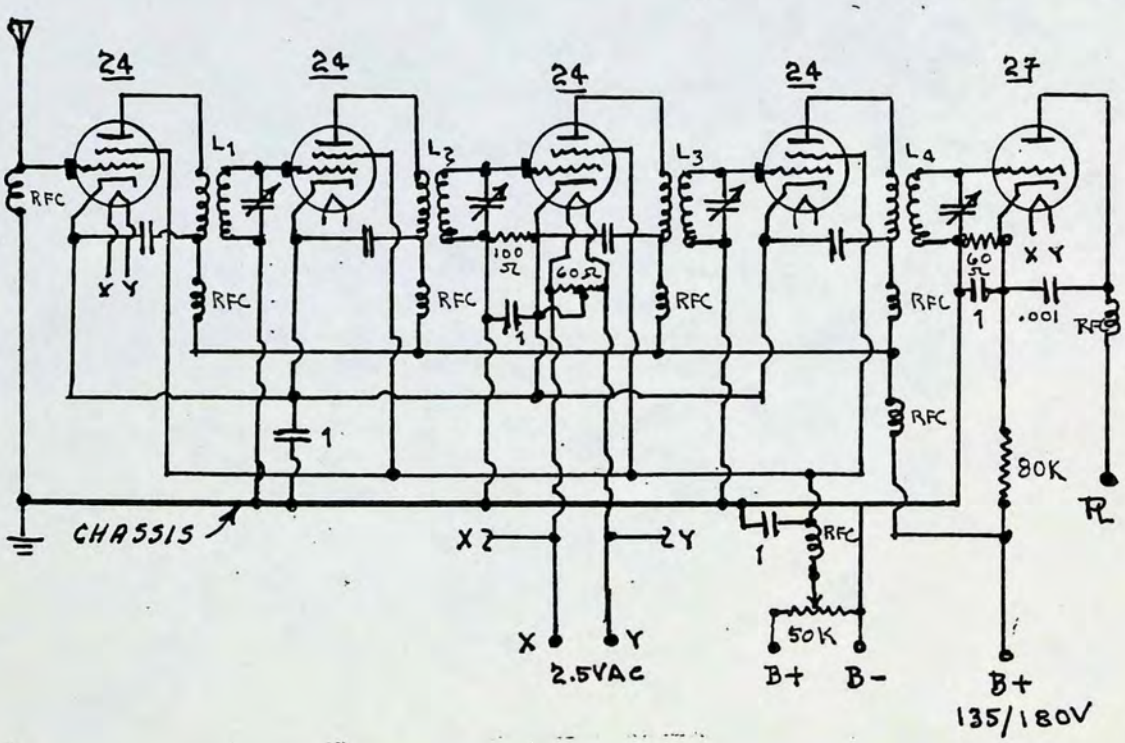
In both versions, the RF coils were critical, made by NATional, and could not be substituted.

* * *
* *
*

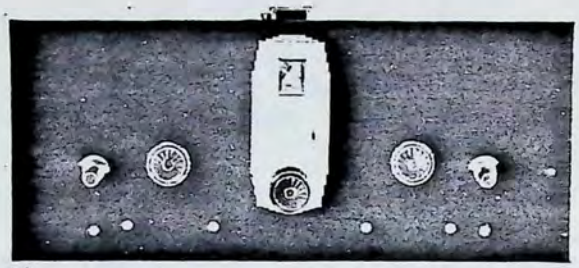
MILLEN-BROWNING MB-29 S.G. Receiver, 1929

While so-called collaborations between early radio designers was fairly common, especiallt among parts manufacturers, this collaboration (and there were others) was unique in the biography of early radio collaboration, in that each man was equal to but not greater than the other.

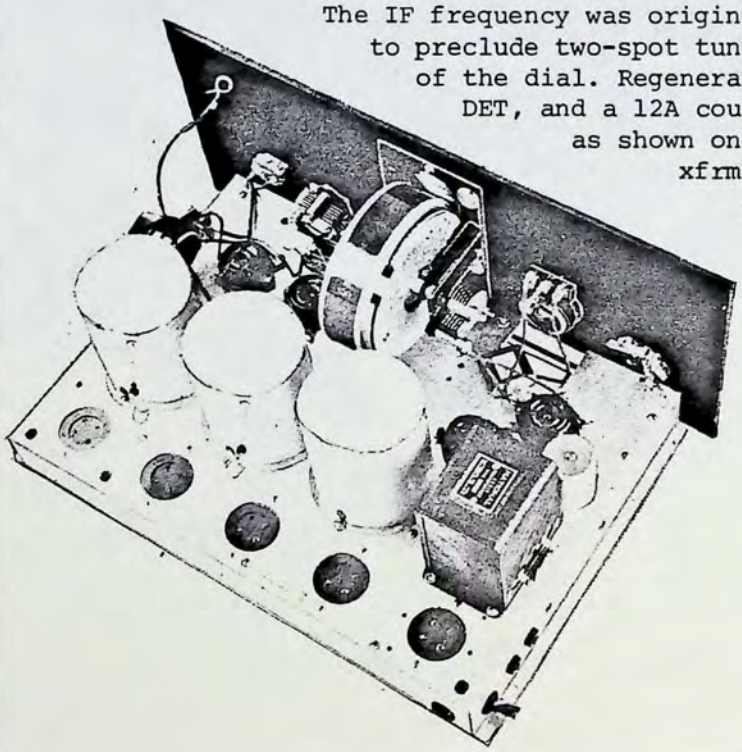
NOTE: This was a tuner only: an AF amplifier with 45s in P-P was recommended. The National SG. RF transformers came complete with RF chokes and by-pass (L1 to L4).



NATIONAL/HATRY 6-TUBE SW RECEIVER, 1928; Sht.1



In a sense, this very efficient SW receiver may be considered to be the precursor of the NATIONAL MB-29, although L.W.Hatry was indeed, an excellent radio designer in his own right. Probably the most interesting aspect of the circuit was that it openly acknowledged the contribution of LACAULT's modulation theory, in which, in this case, the first DET tube is used as a space-charge device. Where LACAULT is rememembered for making the OSC RF current the DET plate supply, HATRY used used OSC and signal frequencies mixed in the OSC current, and placing it on the space-charge grid, by means of which it, too, modulated the DET plate current. Hatry, unlike some, readily admitted his endebtedness of LACAULT, thus placing himself in the same class with NAKKEN.

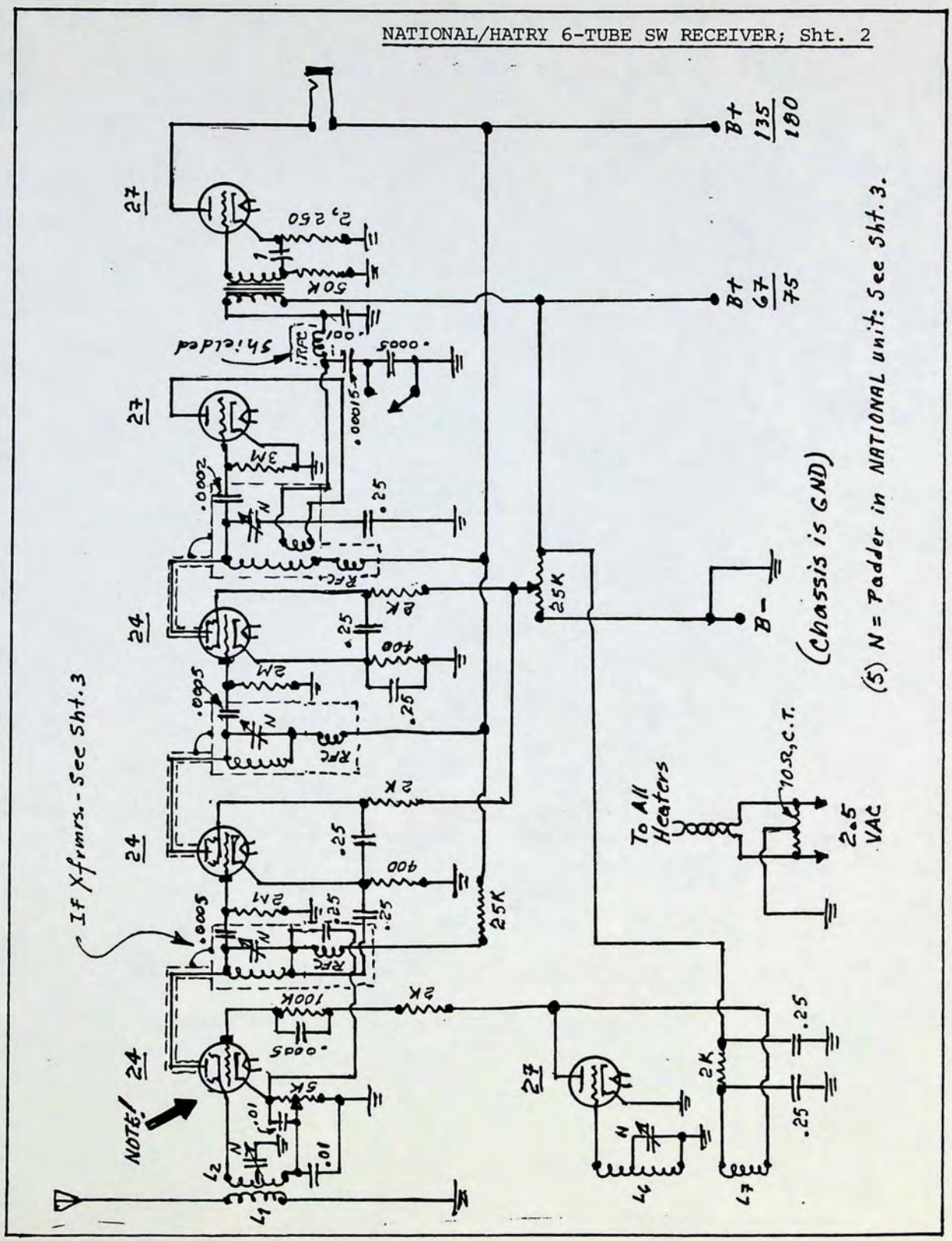


The IF frequency was originally designed at 1500 KC to preclude two-spot tuning, except at extremes of the dial. Regeneration occurred in the 2nd DET, and a 12A could be substituted for 27 as shown on the schematic. Another xfrmr.-coupled AF stage with a 40 tube could also be added, with both the AF xfrmrs. having a 3:1 turns ratio.

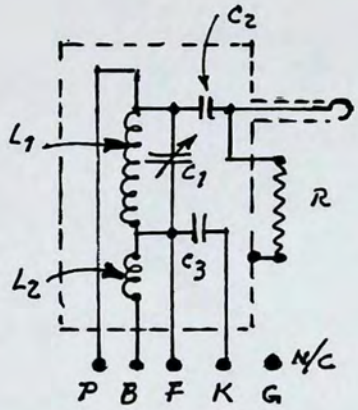
The shielded RFC was a HAMMARLUND type 85 mH; all others were NATIONAL.

* * *
* *
*

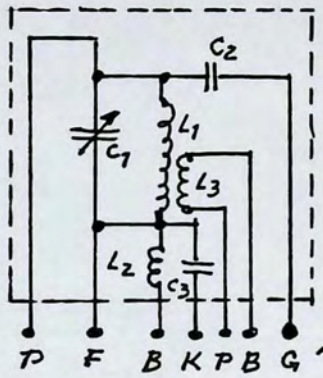
NATIONAL/HATRY 6-TUBE SW RECEIVER; Sht. 2



NATIONAL/HATRY 6-TUBE SW RECEIVER; Sht. 3



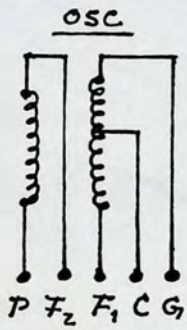

(A) Inter-tube type.

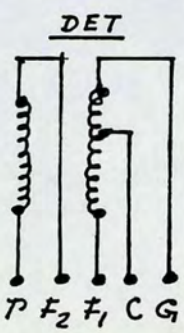


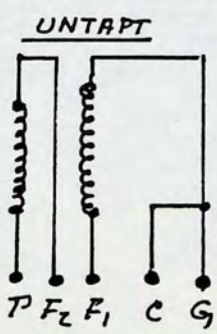

(B) AMP to DET Type

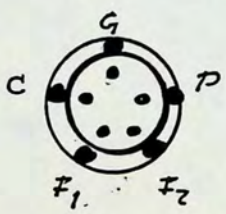
## IF XFRMR. CIRCUITRY (Auto. Couplers)

$L_1$ = Xfrmr. Winding.
$L_2$ = RFC.
$R$ = RF Tube Grid Leak.
$C_1$ = Tuning Cond. for $L_1$. (N)
$C_2$ = Grid Cond.
$C_3$ = By-Pass.




SOCKET TERMINALS

## WIRING FOR PLUG-IN COILS

NOTE: These connexions are critical! 5-Prong Type. See Sht. 4 for Coil Winding data.

NATIONAL-HATRY 6-TUBE SHORT-WAVE RECEIVER; Sht.4

COIL DATA

| OSC Coils: | L5 | Tap | L6 | Range |
|---|---|---|---|---|
| O1 | 7T | 4T | 5T | 13K/15K KC |
| (Use O1 w/ A2) | | | | 10K/12K KC |
| O2 | 18T | (No Tap) | 10T | 10K/12K KC |
| (Use w/ A4) | | | | 3K/4.8K KC |
| O3 | 31T | (No Tap) | 14T | 4.7K/6K KC |
| (Use w/ A6) | | | | 1.7K/3K KC |

| ANT Coils: | L2 | Tap | L1 |
|---|---|---|---|
| A1 | 8T | 4T | 2T |
| A2 | 11T | 5T | 2T |
| A3 | 13T | - | 2T |
| A4 | 33T | - | 3T |
| A5 | 18T | - | 3T |
| A6 | 50T | - | 5T |

L2 & L5 wound w/ #22 DSC Wire.

L1 & L6 wound w/ #30 DSC wire.

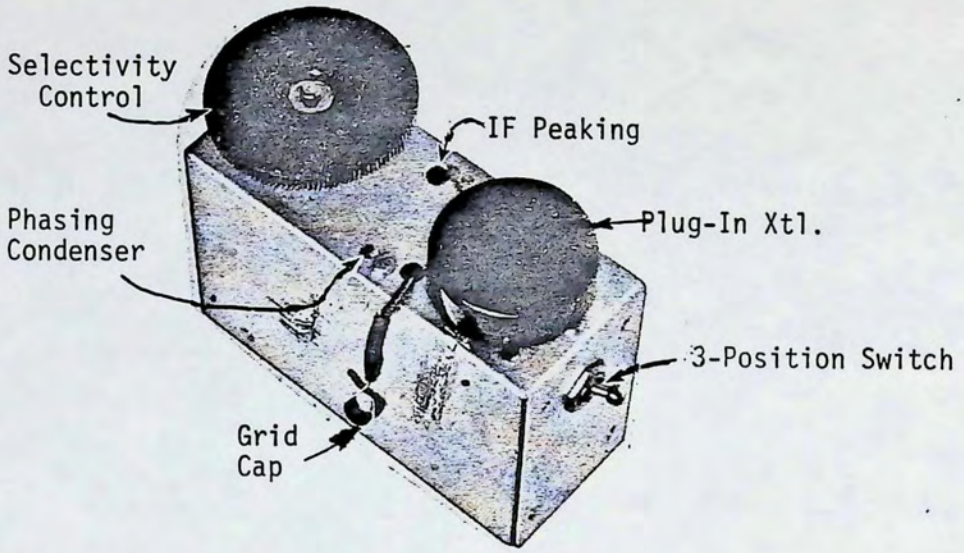
On A2, L2 is wound w/ #30 DSC.

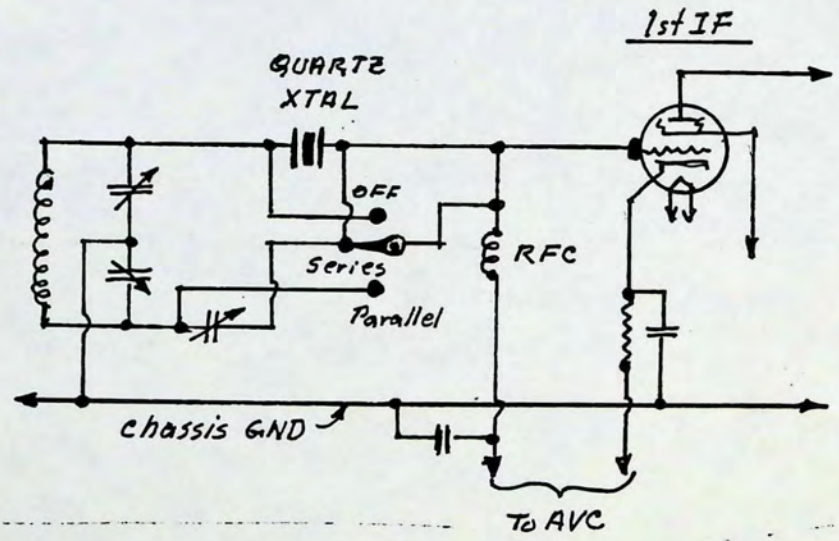
Spacing between L5 & L6, or L1 & L2 = .125".

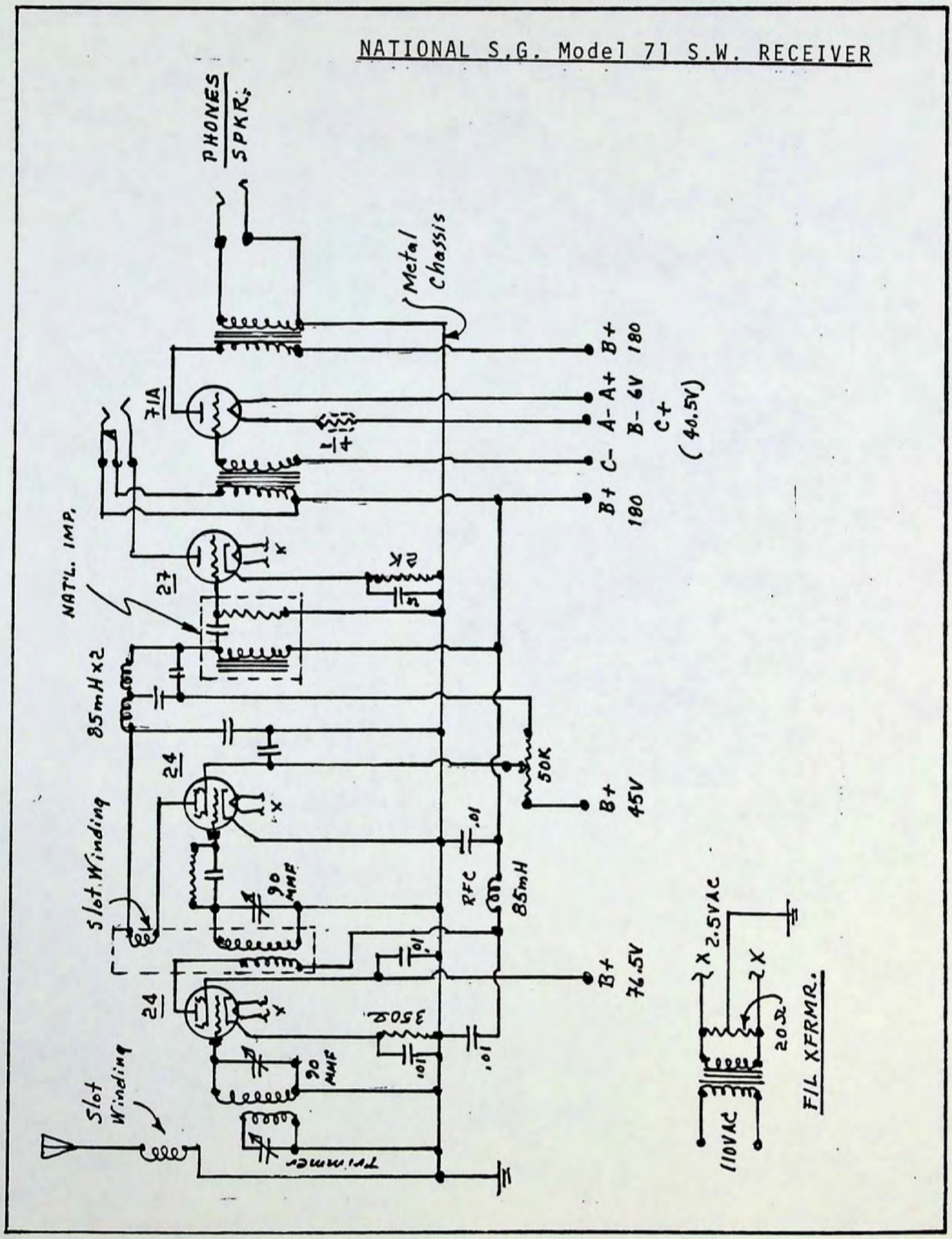
Wire is wound with wires touching.

National coil forms used.

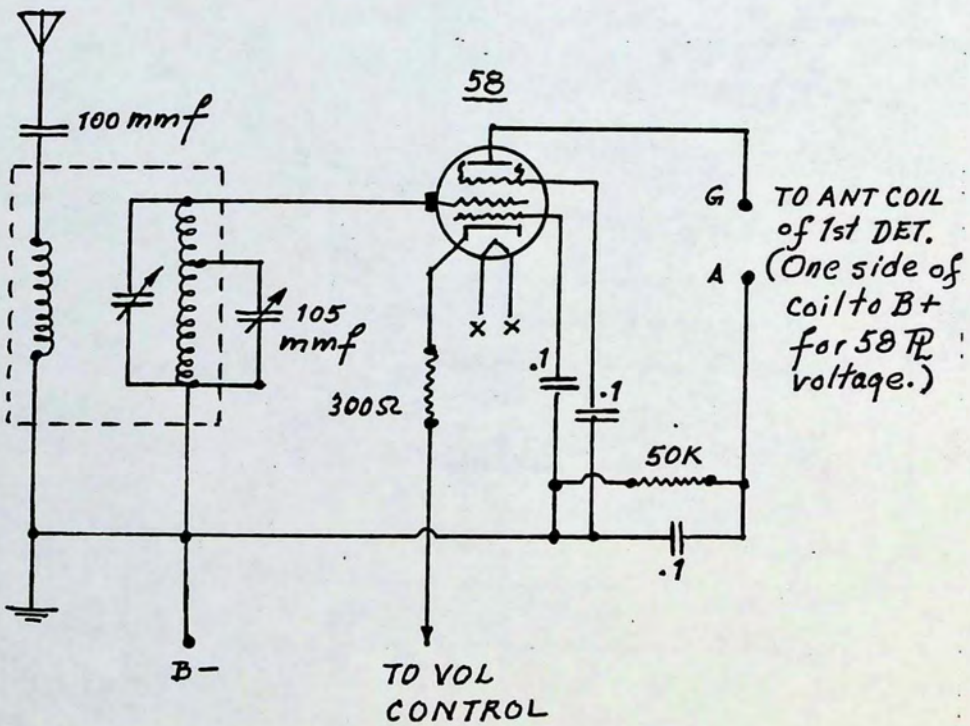
NATIONAL FB-X SINGLE SIGNAL ADAPTER




NATIONAL S.G. Model 71 S.W. RECEIVER
PHONES
SPKR.
Metal Chassis
71A
1/4
NATL. IMP.
27
2K
85mH x2
24
50K
B+ 45V
Slot Winding
30 MMF
RFC
85mH
.01
B+ 76.5V
350Ω
20 MMF
Trimmer
Slot Winding
B+ 180
A+ 180
B- 6V
C+ (40.5V)
C- B+ 180
2.5VAC
2V
2.0Ω
110VAC
FIL XFRMR.

NATIONAL PRE-SELECTOR, 1934



# Velvet Vernier Dials

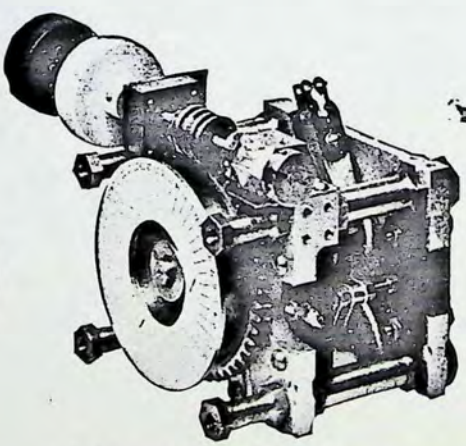
Types E and F

Types G and H

Types B and C

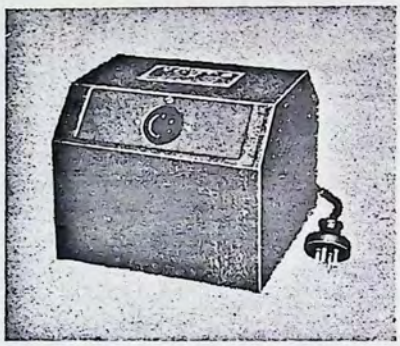
Type A

Type N



Laboratory Precision Condenser

# Quality Radio Products



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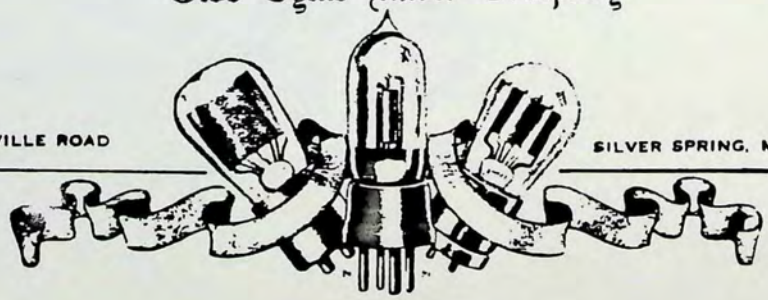

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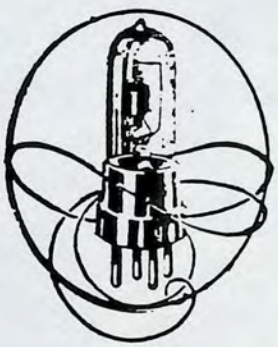

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